- East Texas paper mill—operation and equipment
- Automatic roll handling at Powell River
- Wax, polyethylene-wax, and polyisobutylene-wax coatings
- Metering chemicals

The Paper Industry

Publishers of PAPER AND PULP MILL CATALOGUE

TECHNOLOGY DEPT.

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Size Requirements (without Nalco 680)	30.25 lb.
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Savings on Size (at 15.3 cents per lb.)	$1.32
Savings on Alum (at 2.2 cents per lb.)	.22
	$1.54
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TOTAL NET SAVING, per ton of paper	$.95

Nalco #680
STABILIZED *Sodium Aluminate*

** Cutting size and alum requirements is only one advantage of Nalco 680 — the best, the most stable commercial grade sodium aluminate you can buy! Use it for higher pH and lower acidity!*

Don't confuse the production saving in this case history with a cutback in essentials. This mill makes fine writing paper, and quality is the number one requirement.

How Nalco 680 improved specifications while cutting the cost is obvious in the following: *Size test ratings jumped from a range of 45-50 up to 50-60. Ash content went from 5.6-5.8% to 7-7.1%.*

There are many, many other case histories of Nalco 680 success—power savings, greater alumina retention, cleaner machines, better products.

If you would like results like this in your mill, we suggest you check with your Nalco Representative. He has the facts on Nalco 680 applications and will help you all along the way.

NATIONAL ALUMINATE CORPORATION
6232 West 66th Place • Chicago 38, Illinois

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7 ways it serves and saves

1. FIELD CONSULTATION: Expert technicians, trained and experienced in all phases of ground water development, are available to Layne clients through Layne associate companies.

2. TRAINING LAYNE PERSONNEL: Layne field operators are trained in new techniques and in the use of materials proved in practical applications as well as in the laboratory.

3. CORROSION PREVENTION: Rust and other corrosion prevention, through the use of properly selected materials for well casings, screens and pumps, including cathodic protection by sacrificial metals and the use of tested resistant paint coatings, are major research developments.

4. REHABILITATION OF EXISTING WELLS: Major expense is often avoided by rehabilitating existing wells and developing new wells by methods initiated in the Research Division.

5. SELECTION OF WELL SCREENS TO WELLS: Well screens, gravels and formation sands are correlated to secure maximum trouble-free water productions with a minimum of screen losses, as the result of Layne Research.

6. IMPROVED WELL CONSTRUCTION TECHNIQUES: Work of the Research Division has resulted in many new materials, including Laynite well cements for sealing well surface casings, Laynite additives for treatment of wells, and Laynite rotary drilling muds.

7. ANALYTICAL STUDIES: Basic research determining corrosion causes, deposition of minerals, micro-bacterial growths, effects of dissolved gases and remedial treatments, is an ever-continuing subject for the Research Division.

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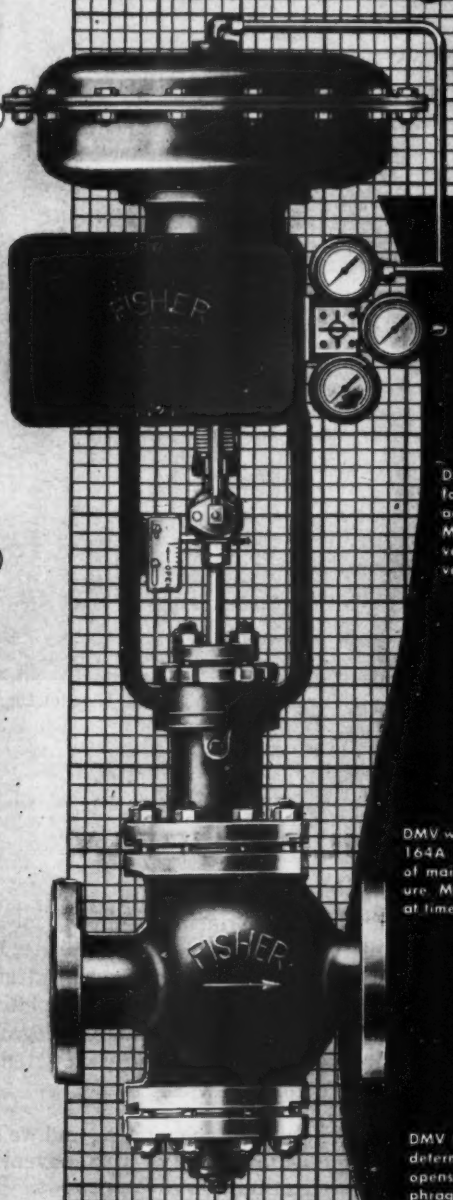
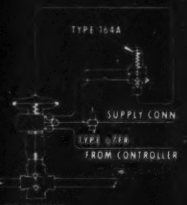


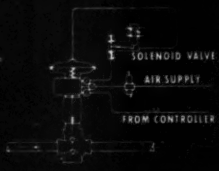
TYPICAL EXAMPLES OF FISHER DIAPHRAGM MOTOR VALVE WIDE RANGE ADAPTABILITY

DMV with Hand Jack Operator. Allows for manual operation against spring action. Limits travel of valve. Example—Maximum opening in spring opened valve. Minimum closing in spring closed valve.

DMV with Continuously Connected Handwheel. Operator can open or close valve against controller action. Can operate valve manually if operating medium fails. Can set maximum opening or minimum closing of inner valve.

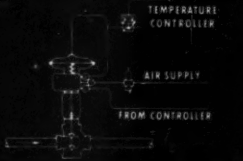


DMV with Air Lock-up system using Type 164A to close air circuit to diaphragm of main valve in case of plant air failure. Main valve will be held in position at time of supply pressure failure.



DMV with Remotely Actuated Electric Solenoid Trip Out. Valve may be fully opened or closed by unloading operating pressure from diaphragm by solenoid operation. Solenoid is actuated from manual switch or an electric tie-in circuit.

DMV with Air Cut-out Feature. At predetermined pressure setting, unloader opens and bleeds pressure off diaphragm to keep main valve open. Unloader orifice is larger than controller orifice so main valve remains open. Operation restored by putting thumb over open end of unloader.



DMV with Auxiliary Controller Override. An auxiliary controller, such as temperature, placed in operating air line to diaphragm—can over-ride action of main control function by unloading diaphragm and taking over functional operation of DMV.

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Aerial view of Alberni Pulp & Paper Division, MacMillan & Bloedel Limited

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The Paper Industry

Technology • Engineering • Management • Production

VOLUME 38 • NUMBER 6 • SEPTEMBER 1956

Published monthly by:
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THE PAPER INDUSTRY—founded in 1919—known as "The Paper Industry and Paper World" from June, 1939, through December, 1949, assumed its original title with the January, 1950, issue.

Published at 1501 Washington Road, Mendota, Illinois.

Address all correspondence intended for publication to Editorial and Executive Office, 431 South Dearborn Street, Chicago 5, Illinois.

Member: Business Publications Audit of Circulation, Inc.

Accepted as controlled circulation publication at Mendota, Ill.

Subscription rates: United States, U. S. Possessions and Canada, $3.00 for one year. All other countries, $8.00 for one year, $18.00 for three years, payable in advance in U. S. Funds.

Features . . .

Editorial — There is always room for improvement in materials handling 443

Whither? — Waterproof paper for termite control, how much water to grow a cord of pine pulpwood? paper forms for concrete slabs, guar gum in plentiful supply, research in sulfite liquor disposal, increased whiteness of Calcofluor dye-treated paper 550

Operation and equipment highlights at Eastex mill 470

Organic coatings for paper — Part V 480

Automatic roll handling at Powell River 484
by Colin Campbell

Cold soda pulping of aspen by improved methods 487
by Kenneth J. Brown and William H. Monsson

Metering chemicals in papermaking 488
by A. M. Kohn

Forward look in pulpwood cars unveiled by Canadian National 498

Paper machine installation completed by Westfield River 503

News . . .

News of the Industry 498

Names in the News 511

Necrology 516

Safety 521

Departments . . .

Current Comments 496
Coming Events 509
Patents 524
Foreign Abstracts 531
New Products 535
New Literature 543
Current Market Quotations 547
Index to Advertisers 549

The PAPER INDUSTRY is indexed regularly in **Engineering Index** and **Industrial Arts Index.** An index to each volume is issued annually by the publisher as a part of the April number.

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Inside story:

Valves may look alike on the surface. Their performance is another story. And the inside story of Powell Valves is that *every* Powell Valve has *Performance Verified.*

X-ray and gamma ray inspection—examining the very structure of the metal itself—are two of the many ways that Powell can make absolutely certain that Powell Valves will give *dependable* flow control.

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The Wm. Powell Company, Cincinnati 22, Ohio . . . 110th YEAR

PERFORMANCE PV VERIFIED

FIG. 2193—Large Size Ni-Resist O.S. & Y. Gate Valve for 200 Pounds W.O.G.

FIG. 2491—Stainless Steel O.S. & Y. Gate Valve for 150 Pounds W.P.

FIG. 2608—Bronze Full Flow Globe Valve for 200 Pounds W.S.P.

POWELL VALVES

BRONZE, IRON, STEEL AND CORROSION RESISTANT VALVES.

From our point of view . . .

There is always room for improvement in materials handling

The need for improved materials handling methods becomes obvious when we contemplate the results of many surveys showing that more than 25 per cent of all labor hours are spent in the handling of materials, both raw and finished. It is for this reason that the article on automatic roll handling at Powell River, by Colin Campbell, published in this issue is being singled out as an example of what can be done in the way of improvements in this industrial operation which is not always credited with the importance it deserves.

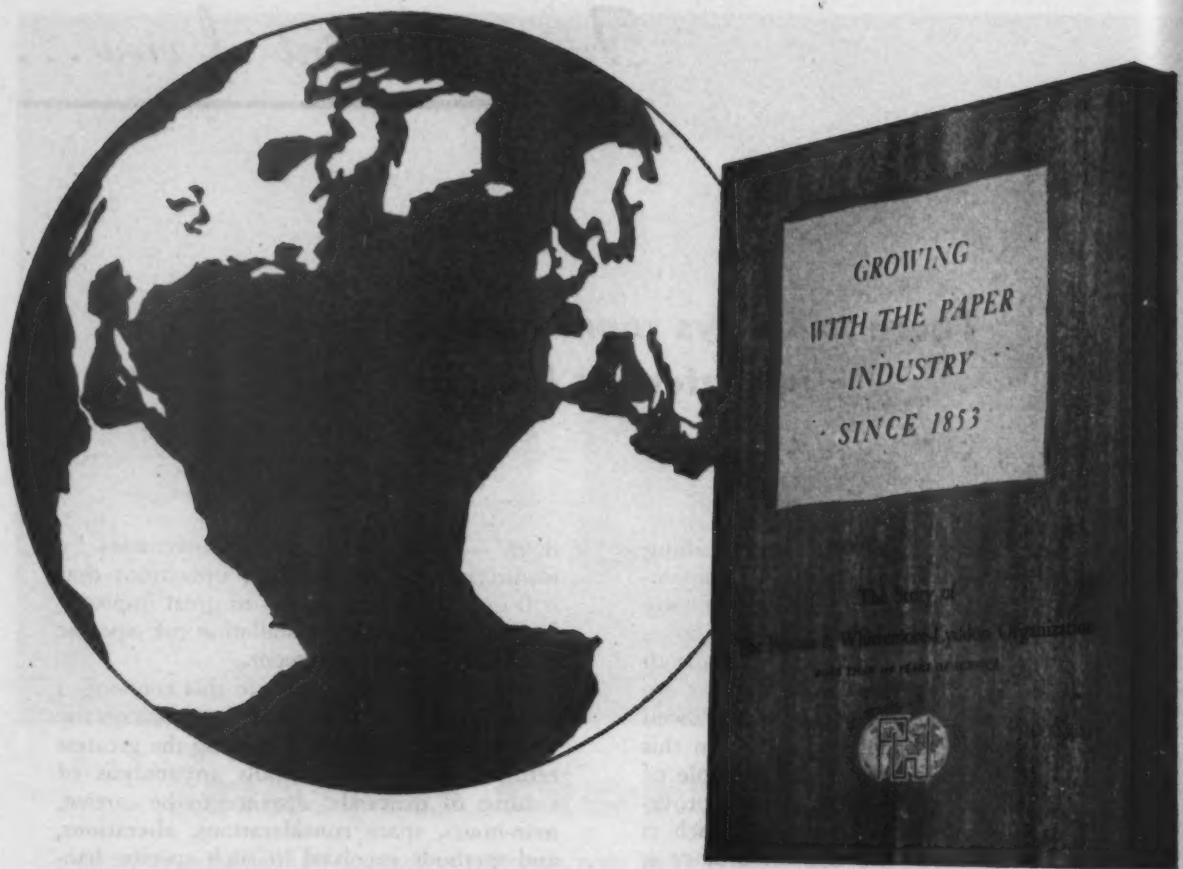
While the major part of the Powell River automatic roll handling installation follows conventional lines, as we know them in this country, there are two noteworthy innovations: (1) the automatic shaft handling, and (2) the near-automatic core feeding. These two innovations have done away with the manual extraction of the 400-lb., 22-ft. long shaft, reloading the shaft with cores and putting it back on the machine.

A recognition and identification of materials handling problems is a prerequisite to the implementation of many handling improvements; and while it is generally understood that new buildings and layouts offer the best opportunities for the adoption of complete systems of modern handling, it is not impossible for imaginative management — even under old and antiquated layout conditions — to institute spot improvements by identifying certain handling operations that will easily lend themselves to great improvements through the installation of specific modern handling equipment.

It is of course necessary in this connection to concentrate on such handling problems the improvement of which will bring the greatest returns; this usually entails an analysis of volume of materials, distance to be carried, man-hours, space considerations, alterations, and methods involved in such specific handling problems.

It will pay management to familiarize itself with the theory of handling and keep informed of the rapidly accelerating rate of improvements in materials handling methods. The entire problem cannot be left to the solution by a visiting materials handling engineer, for it usually requires a consideration of conditions peculiar to each mill and the reconciliation of such conditions with the over-all problem to arrive at a most satisfactory layout of the mill's materials handling system.

Improved handling is a positive step toward increasing the mill's productivity by reducing the costs of production and distribution. This is the final argument that has led many successfully run mills to view the problem of materials handling as one of major importance in pulp and papermaking.



New book describes world-wide pulp & paper development services

Here is a book that tells how you can profit by using the comprehensive world-wide services of The Parsons & Whittemore-Lyddon Organization. With more than 100 years of experience, this international organization can facilitate your pulp and paper business development anywhere in the world. "Growing with the Paper Industry" explains these services:

Marketing wood pulp, and *developing new pulp and paper business abroad.*

Testing and research, to determine the suitability of such raw materials as cereal-straw, rice-straw, bagasse, abaca, esparto grass, eucalyptus, bamboo and fast-growing tropical hardwoods, in the making of paper.

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Write for your free copies of these books.

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World Leaders in the Development of Pulp Mills for the Use of Bagasse, Straw or Other Vegetable Fibres

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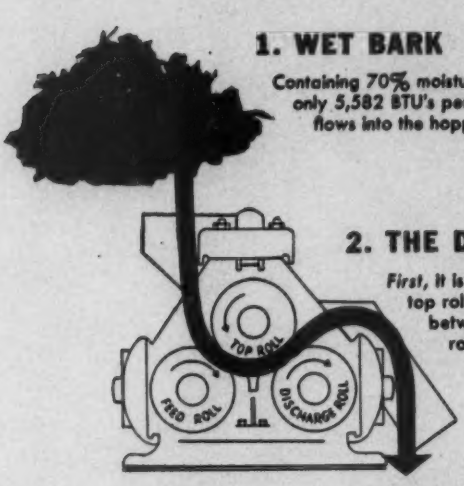

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3. DRY FUEL

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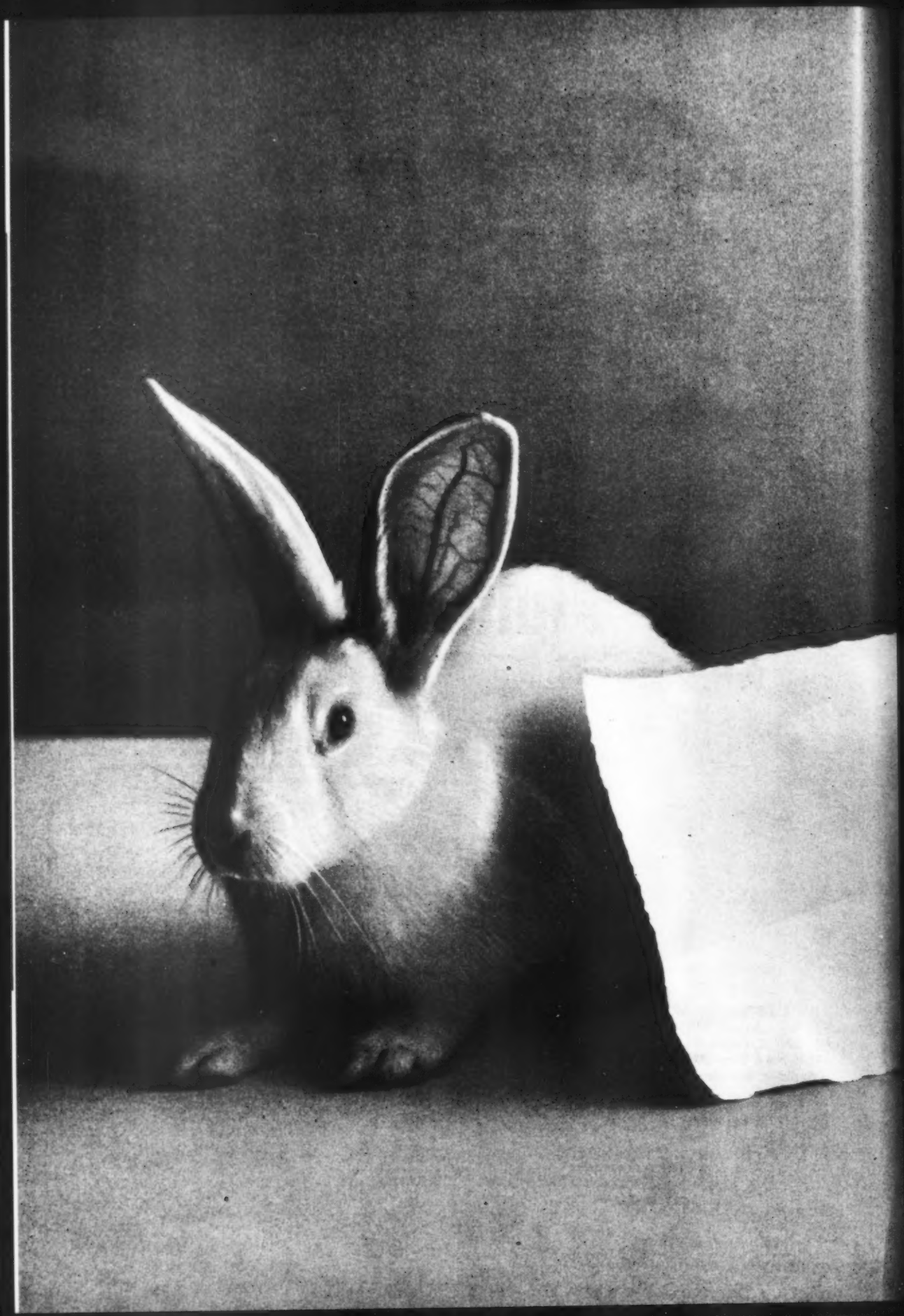

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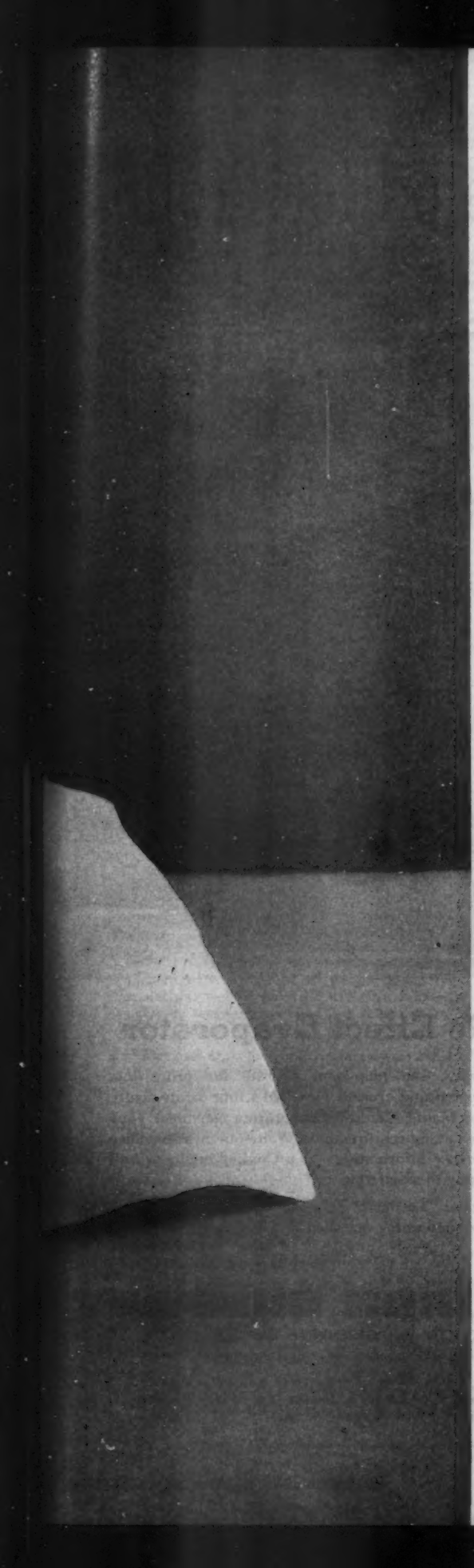

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New mill ready ahead of schedule to bring you a dependable supply of highest-quality bleached kraft pulp.

Rising in record time, in a specially-created town in Alberta, the Hinton mill will provide a steady supply of bleached kraft pulp of superior quality. It will be ready in January to roll out 430 tons a day.

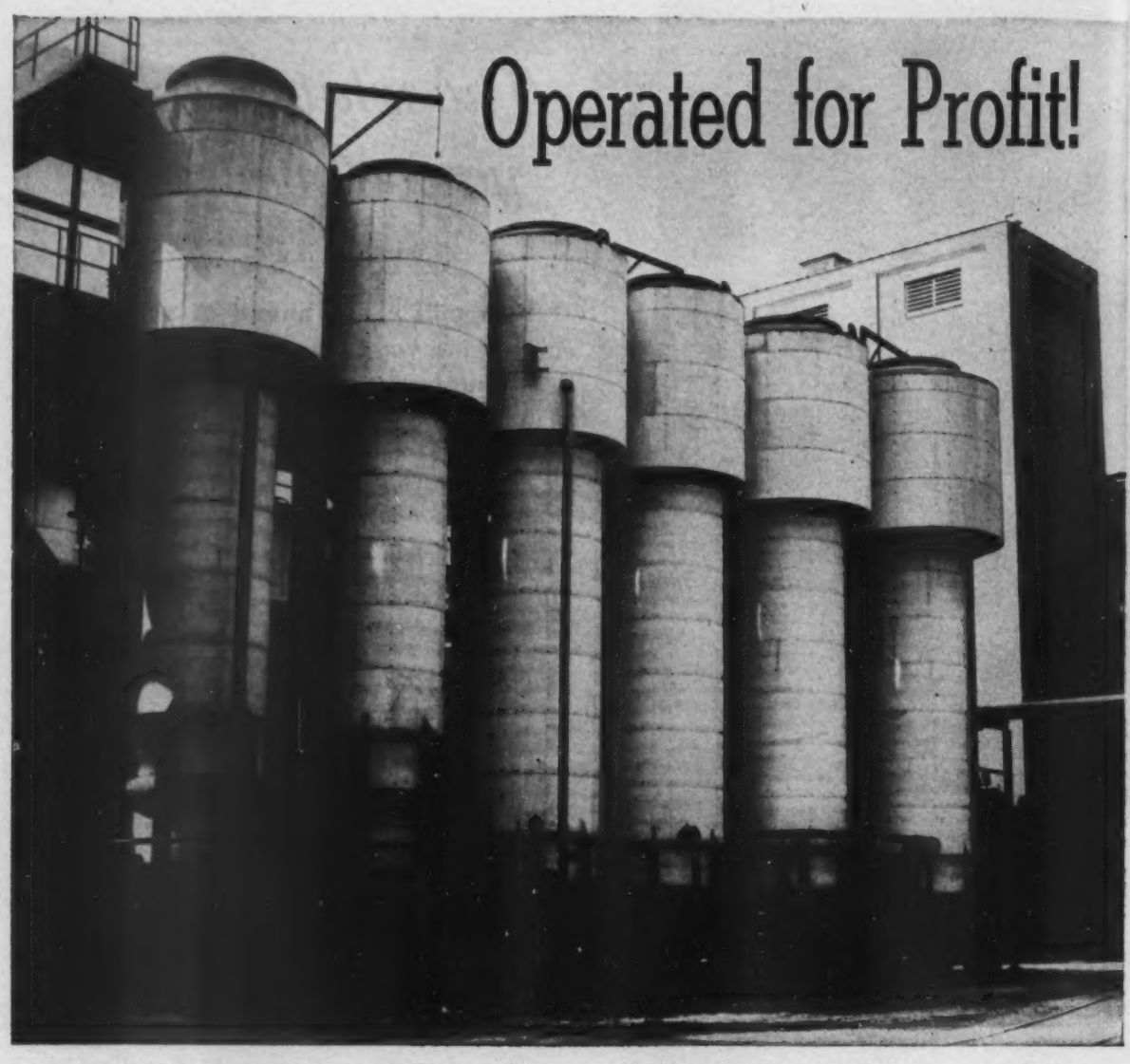
This pulp—St. Regis *Alberta Hi-Brite*—will give you remarkable brightness, with unusual opacity, strength, forming properties and cleanliness. Its flexibility will make it suitable for use as a versatile furnish in any sheet requiring bleached pulp.

4 million acres of adjacent forest reserves assure the mill a perpetual yield of spruce and lodgepole pine. These slow-growing softwoods produce the longer, thinner fibres famous for their excellent pulping properties.

This advanced multi-stage chlorine dioxide process, used only by St. Regis, gives *Alberta Hi-Brite* its gleaming whiteness and high brightness. The continuous digester method permits constant quality control and uniformity of output.

For full information on how Alberta Hi-Brite can improve the quality of your product, write to St. Regis Paper Company, Dept. PP-956, 150 East 42nd Street, New York 17, New York.

ST. REGIS SR PAPER COMPANY



CONKEY Six Body Sextuple Effect Evaporator

Paper and pulp products are in great demand . . . but for a mill to operate profitably it is necessary to produce the required volume more economically. Proof of the economical operation and sound engineering of Conkey Evaporators is their many installations in new mills . . . and the *repeat orders* received for expanding mills.

Performance . . . and personal service of Conkey engineers, can help *you* operate for profit too. Fabricated and erected by CB&I's four strategically located plants, Conkey Evaporators can meet your most exacting requirements. Write our nearest office for further information . . . a Conkey engineer will be happy to assist you.

Above: Six body sextuple effect Conkey black liquor evaporator installed at a southern pulp mill.

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Operating records show you can run coating machines faster, too.

Faster Blending, Greater Polyethylene Content Now Possible for Your Wax Formulations

A-C* POLYETHYLENE speeds blending and is compatible with waxes in all proportions. This low-molecular-weight polymer remains suspended and extreme temperatures are not required for blending or coating operations.

Because of its low melt viscosity, you can increase the percentage of polyethylene in your formulations.

A-C POLYETHYLENE offers you these 9 advantages:

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5. **Reduced blocking**
6. **Remains in suspension**
7. **Greater advantage of increased polyethylene content**
8. **Can be run on present equipment**
9. **Coatings are easier to apply**

*Trade-mark

These important features have been proven in commercial production!

Try A-C POLYETHYLENE for up-grading your wax formulations. If you prefer to buy pre-blended waxes, your local oil refiner can supply A-C POLYETHYLENE blends. Write today for technical literature and free samples.

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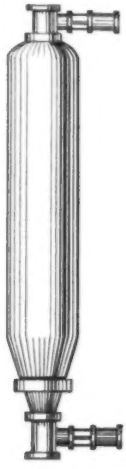
Now the Bauer Line includes equipment for processing pulp from the raw chip to the paper or board machine.

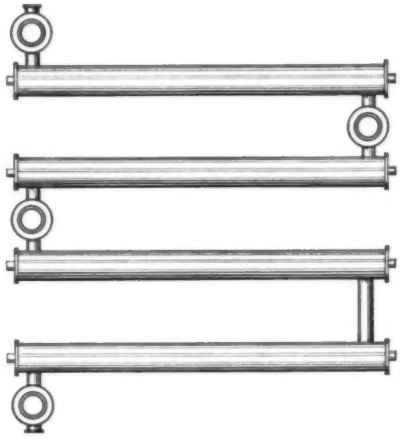
Besides the Rapid Cycle and Continuous Digesters, Bauer equipment comprises Pressafiners, single and double revolving disc refiners, "Pump Through" refiners and Centri-Cleaners. All are shown in our Bulletin No. 56. Each is fully described in a separate bulletin.

The digesters are for full chemical, semi-chemical, and steamed wood operation.



Bauer Rapid Cycle Digester

This automatic quick-acting stationary digester cooks wood chips through rapid time cycles which are possible by means of elevated temperatures and pressures. Cooking occurs in either the liquid or vapor phase. Operation is simple. The compactness of the digester provides high capacity in minimum space. Maintenance requirements are very low due to few moving parts in the pressure area.



Bauer-Grenco Continuous Digester

Actual mill experience proves that this digester provides all the advantages of continuous operation, principally due to the unique rotary valves. Minimum degradation occurs when chips are introduced into and expelled from the cooking chamber. The valves afford an excellent means of isolating the digester tubes. Being extremely versatile, the Continuous Digester can be tailored to meet tonnage and end-product requirements.

You are invited to request any or all of our literature; particularly, in this connection, Bulletin P-16 on Continuous Digesters and P-17 on Rapid Cycle Digesters.

THE BAUER BROS. CO.

DISC REFINER HEADQUARTERS

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Ayiti

56

Here is the "INSIDE INFORMATION" on FALK ALL-STEEL Shaft Mounted Drives

Take a careful look inside the Falk all-steel Shaft Mounted Drive, and you will know why this newest member of the famous Falk family is ideal for applications where direct mounting on the driven shaft is desirable. It is the only drive in its field with all these superior "In-built" factors:—

1 **All-steel Frame,** with more than double the rigidity of iron, supports all rotating elements.

2 **Precision Helical Gears,** designed and machined by Falk, rated to AGMA standards.

3 **Pressed Steel Housings,** whose sole function is to keep oil in, dirt out; easily removed for gear inspection without dismounting unit.

4 **Through Hollow Shaft** with counter bore provides for easiest installation or removal from driven machine shaft extensions.

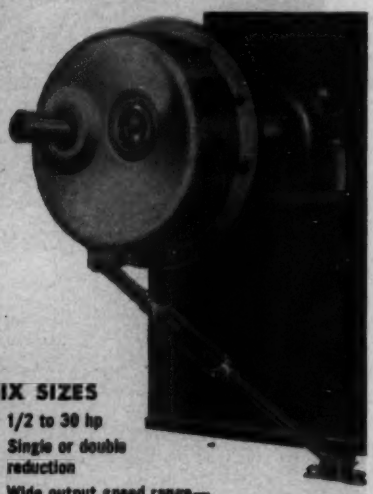
5 **Backstop** can be furnished with the unit or added later for positive prevention of reverse rotation.

6 **Positive Lubrication,** continuous direct dip of revolving elements at all speeds.

7 **Tie Rod** and turnbuckle serve as anchor and facilitate V-belt or chain adjustment.

Write to Department 247 for engineering bulletin, including selection and dimension details.

EFFICIENT SPEED REDUCTION IN LIMITED SPACE

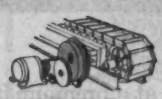


SIX SIZES

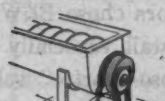
- 1/2 to 30 hp
- Single or double reduction
- Wide output speed range—420 to 10 rpm

Expressly designed for topflight performance on installations requiring considerable speed reduction in limited space, the all-steel FALK Shaft Mounted Drive has quickly won acceptance throughout industry. This sturdy, compact, versatile reducing unit is an ingenious variation of the highly successful FALK Motoreducer design, pacemaker in its field for more than 20 years. Here, the time-proved design is adapted for mounting directly on the shaft to be driven, using V-belt connection to motor. Investigate now!

A FEW TYPICAL APPLICATIONS


APRON FEEDER

LINE SHAFTING


SCREW CONVEYOR

BUCKET ELEVATOR

BELT CONVEYOR

GRAVEL CLASSIFIER

THE FALK CORPORATION, Milwaukee 8, Wisconsin

MANUFACTURERS OF

- Motoreducers
- Speed Reducers
- Flexible Couplings
- Shaft Mounted Drives
- High Speed Drives
- Special Gear Drives
- Single Helical Gears
- Herringbone Gears
- Marine Drives
- Steel Castings
- Weldments
- Contract Machining

FALK

...a good name in industry

These B&W Elbows Need Less ELBOW ROOM

ELBOW room was at a premium in this piping manifold. Fabricators chose B&W Fittings because they're easy to install, especially in a job like this which calls for "close-quarter" welding. Installation went ahead fast and without trouble, thanks to the accurate dimensions of the B&W Welding Ells used.

Maintenance, too, will be kept at a minimum because, with a sound weld, piping is permanent and leakproof. B&W Seamless Welding Fittings and Flanges are available in a complete range of grades, types, sizes and pipe schedules.

THE *NATURAL* SOURCE FOR ALLOY FITTINGS

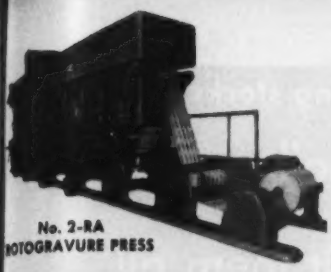
B&W

TUBULAR PRODUCTS DIVISION

THE BABCOCK & WILCOX COMPANY
TUBULAR PRODUCTS DIVISION • FITTINGS DEPARTMENT
3839 WEST BURNHAM STREET • MILWAUKEE 46, WISCONSIN

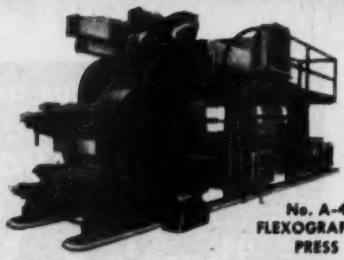
FA-6901

Seamless welding fittings and flanges, seamless and welded tubular products — in carbon, alloy and stainless steels.



No. 2-RA ROTOGRAVURE PRESS

No. A-1 FLEXOGRAPHIC PRESS



No. A-4 FLEXOGRAPHIC PRESS

THESE MODERN HUDSON SHARP MACHINES

Process paper, film and foil in record volume!

MODERNIZING OR EXPANDING? Look this line over carefully when determining your needs for expansion plans or for replacing obsolete machines that cost you a fortune in profits through inefficient and unsatisfactory production.

MACHINES FOR EVERY JOB — Hudson Sharp offers you the *right equipment* from the most complete line available. Illustrated are some of the machines we make for printing, packaging, laminating, waxing, embossing, winding, folding, creping, core cutting and bundling. Naturally, other types and models are offered to fulfill any specific need, either for in-line automation or unitized production of the most exacting nature.

PERFORMANCE PAYS OFF — You'll find Hudson Sharp machines producing work with remarkable capacity and fidelity in leading processing and converting plants throughout the world. These machines make money for their owners because they're soundly and sturdily built for heavy duty usage and are engineered with precision finesse for long life, constant running efficient operation. For the full story, contact our home office or your nearest Hudson Sharp representative.

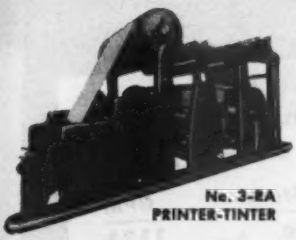
FREE GENERAL CATALOG — Yours for the asking on your company letterhead. It shows you the equipment we make . . . tells you briefly what each machine is all about so you can start the ball rolling on your planning needs. You'll want more detailed information later on.

HUDSON-SHARP

machine company

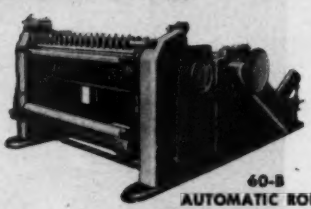
green bay, wisconsin

New York office: 55 West 42nd St.



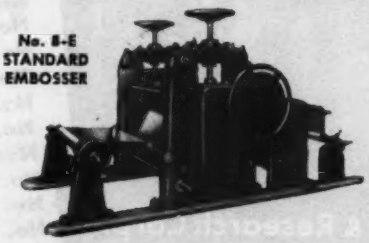
No. 3-RA PRINTER-TINTER

PAPER ROLL AND PACKAGE CUTTER



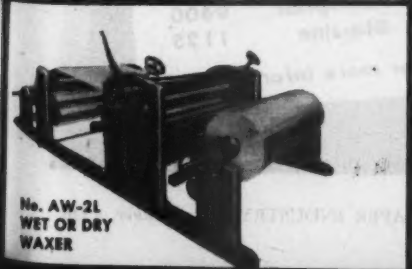
60-B AUTOMATIC ROLL WINDER AND EMBOSSER

No. 50-C CORE WINDER

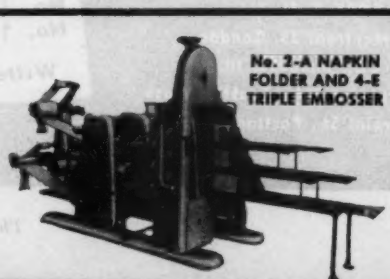


No. 8-E STANDARD EMBOSSER

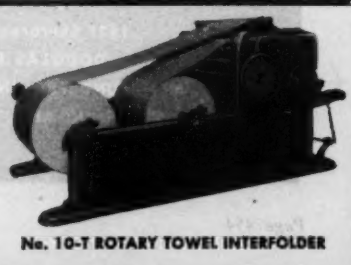
GL-2 GUMMER AND LAMINATOR



No. AW-2L WET OR DRY WAXER



No. 2-A NAPKIN FOLDER AND 4-E TRIPLE EMBOSSER

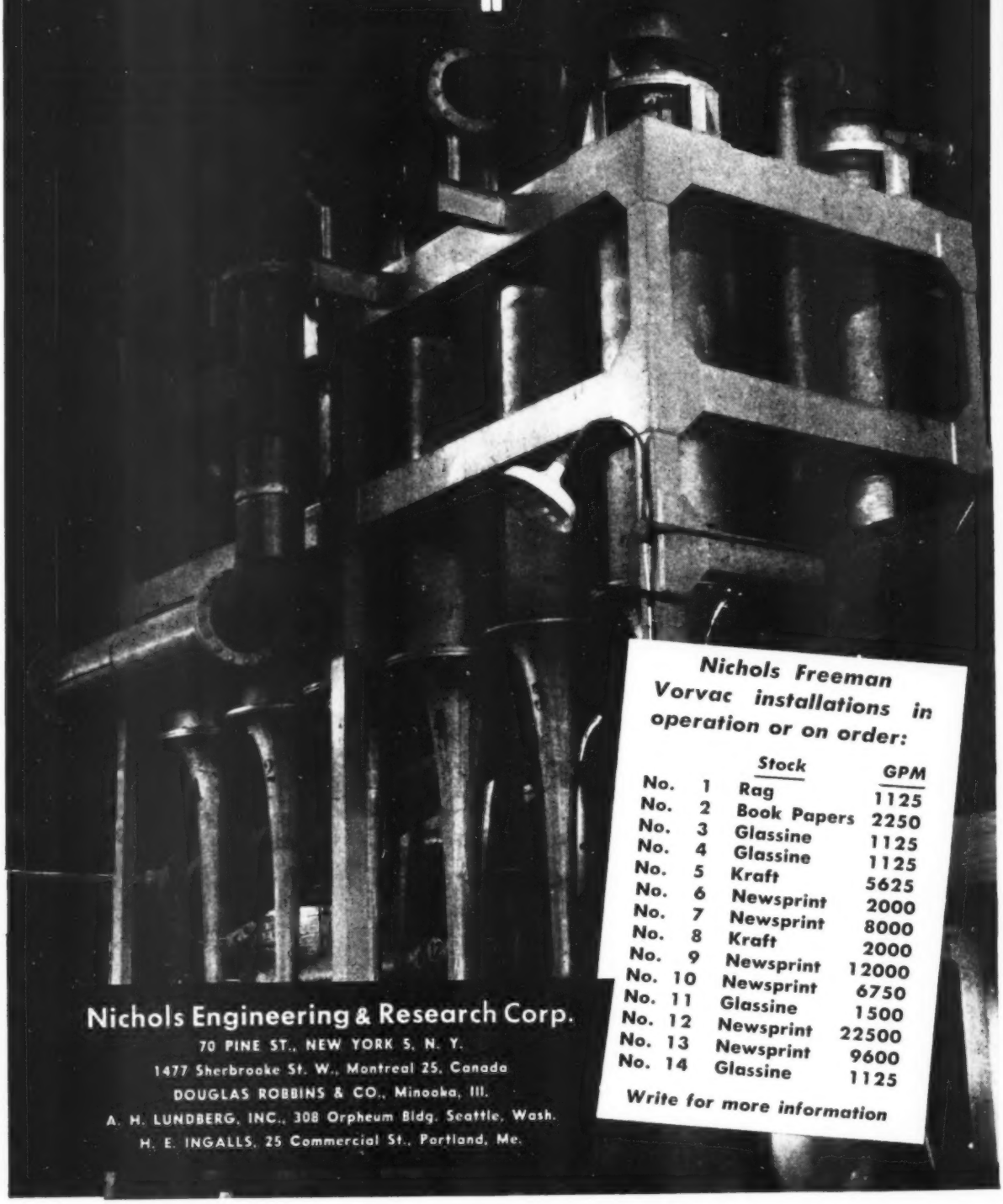


No. 10-T ROTARY TOWEL INTERFOLDER

for simultaneous air and dirt removal from paper making stocks . .

Whether your machine is large or small,

There's a VORVAC system to fit them all



Nichols Freeman Vorvac installations in operation or on order:

		Stock	GPM
No.	1	Rag	1125
No.	2	Book Papers	2250
No.	3	Glassine	1125
No.	4	Glassine	1125
No.	5	Kraft	5625
No.	6	Newsprint	2000
No.	7	Newsprint	8000
No.	8	Kraft	2000
No.	9	Newsprint	12000
No.	10	Newsprint	6750
No.	11	Glassine	1500
No.	12	Newsprint	22500
No.	13	Newsprint	9600
No.	14	Glassine	1125

Write for more information

Nichols Engineering & Research Corp.

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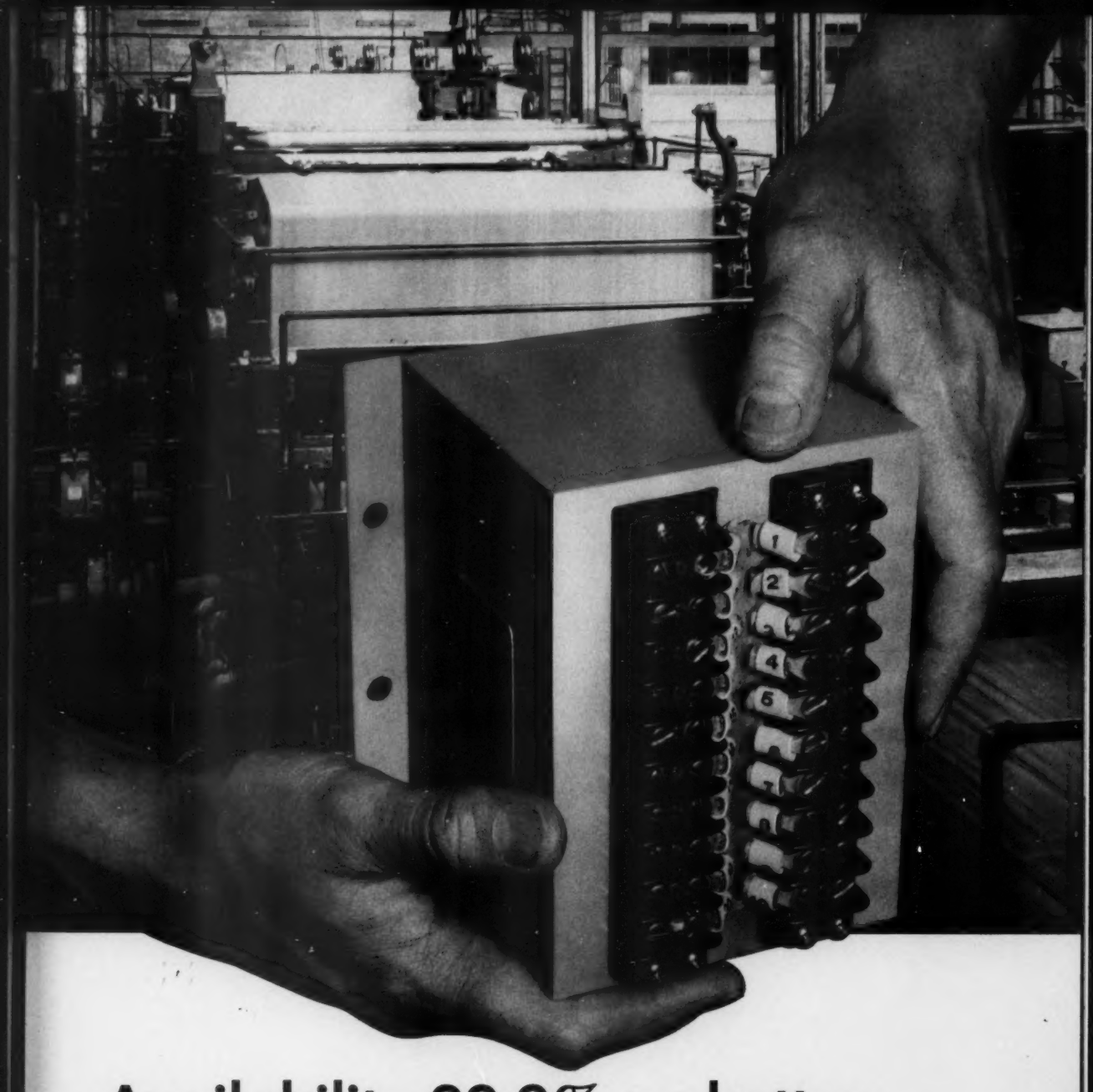
1477 Sherbrooke St. W., Montreal 25, Canada

DOUGLAS ROBBINS & CO., Minooka, Ill.

A. H. LUNDBERG, INC., 308 Orpheum Bldg. Seattle, Wash.

H. E. INGALLS, 25 Commercial St., Portland, Me.

Okay!



Availability 99.9%, or better . . .

for Westinghouse Magamp regulators on sectional drives

Westinghouse Magamp* magnetic amplifier regulators for sectional drives help boost your paper machine production by reducing down time. They provide precise, automatic control and co-ordination of different machine sections, permit increased machine speeds without sacrificing paper quality.

*Trade Mark

Here's how Westinghouse Magamp regulators allow continuous, top-speed operation of your paper machine. →

WATCH WESTINGHOUSE WHERE BIG THINGS ARE HAPPENING TODAY!

Westinghouse Exclusive!

Position and speed signal combined with Magamp cuts down time

Now you can operate your paper machine to the limits of their design, with complete confidence that dependable, accurate control will maintain paper quality.

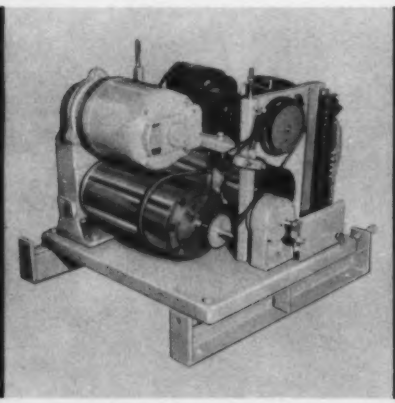
Westinghouse can offer this outstanding performance through its exclusive differential error-detecting unit which combines position and speed signal output with the Magamp regulator.

Teamed with separate position cue and speed cue, Magamp provides accurate speed matching that assures positive control of section draw over the operating speed range. Response is unusually fast.

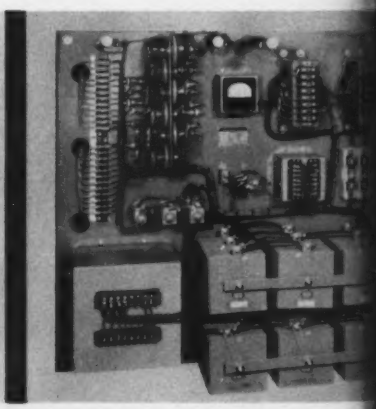
Magamp has no tubes or moving parts. It's rugged, reliable, efficient . . . requires less maintenance than any other type of regulator available. Confirmed records of more than a million unit regulator operating hours show a total availability of better than 99.95%.

Fully automatic control, arranged for convenience of the operators, assures higher production efficiency. Once set, Magamp stays set without adjustment. Elimination of line shafting, belts, pulleys and clutches reduces maintenance and outage time, results in lower operating costs. Magamp units are panel-mounted and factory-wired for easy installation.

Section drive unit is assembled complete with gearing before it leaves Westinghouse plant. Installation costs are reduced, time is saved.



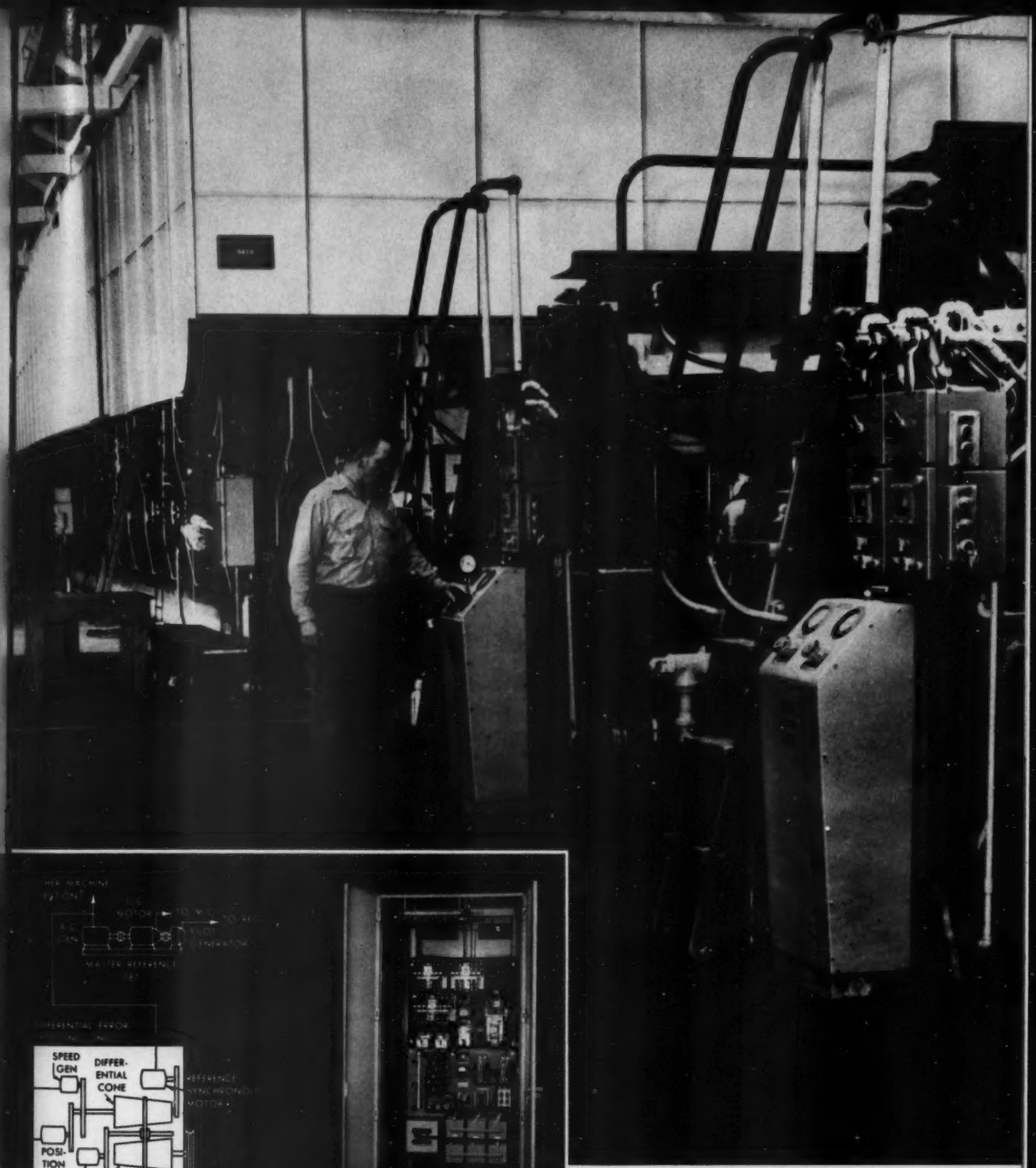
Error-detecting unit (cover removed) provides electrical position and speed signals to the Magamp panel. A minimum of moving parts assures greater reliability.

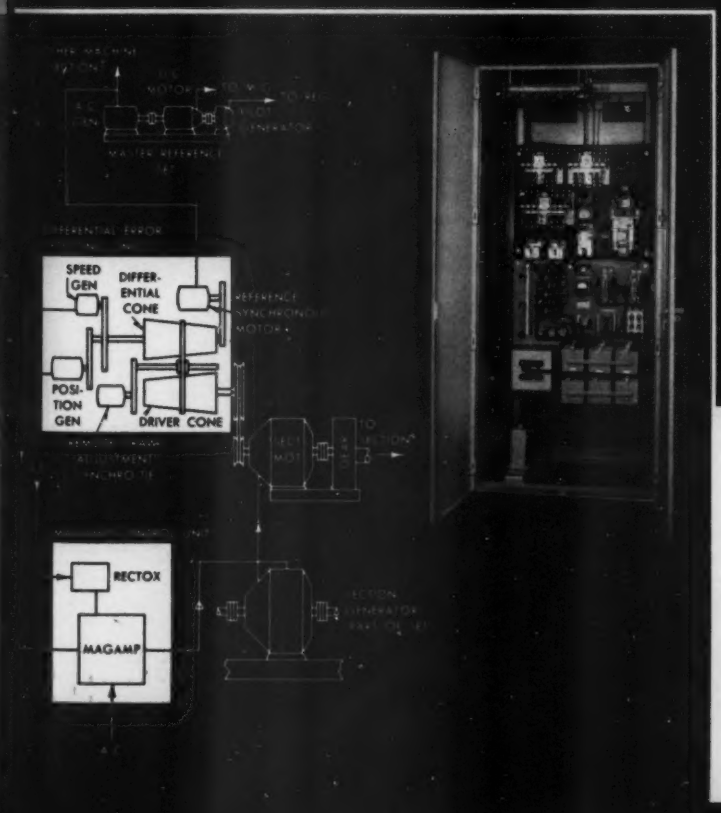


Magamp panel, located in control cubicle, amplifies electrical signals to maintain synchronism among machine sections.

WATCH WESTINGHOUSE!

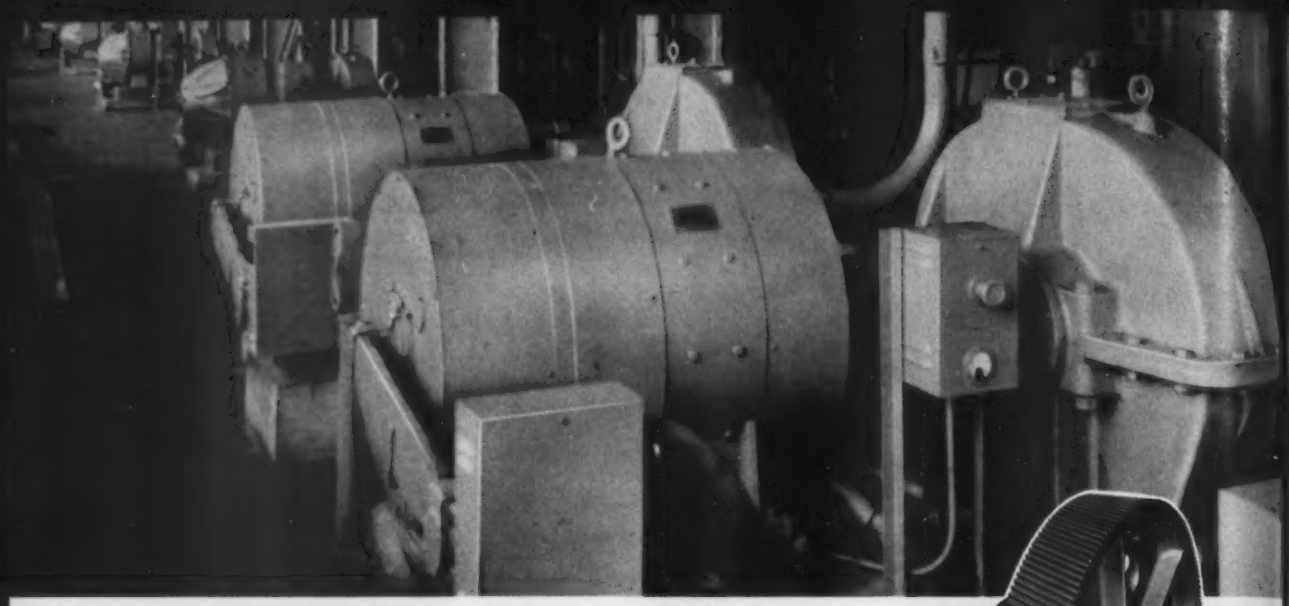
*WHERE **BIG** THINGS ARE HAPPENING **TODAY!***





Magamp regulators on this three-year-old installation have achieved better than 99.9% availability. Operator's control stations (above) and a section control cubicle (left).

How Error-Detecting Unit Operates: Individual section motor speeds are matched to a common reference master set through a mechanical differential. Cone pulleys allow for draw adjustment. The differential output shaft is connected to two small pilots which furnish electrical position and speed signals to the Magamp.



Westinghouse speed reducers, specially designed for paper mill service, are self-lubricated with single helical gears and antifriction bearings. Gear units for the wet end are supplied with dual seals, special breathers and special finishes.

Westinghouse sectional drive assembly gives you five big advantages

Of all sectional drive manufacturers, only Westinghouse makes its own gearing in addition to the electric equipment—thus providing you with one-supplier responsibility for the entire drive system. This assures you several important advantages:

Equipment selection and ordering simplified . . . only Westinghouse need be consulted.

Convenience . . . co-ordinated delivery of all equipment eliminates waiting for component shipments from different suppliers. Only one point of contact is required for servicing all, or any part, of your drive assembly.

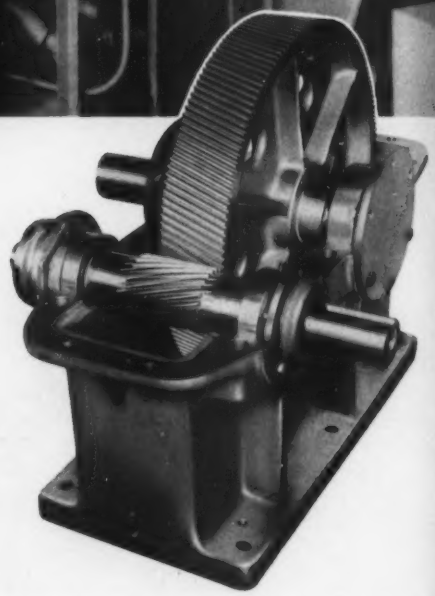
Easy to install . . . no complicated alignment and coupling problems. Every piece of equipment is designed to fit into a unified drive assembly.

Long, dependable service . . . controls, motors, flexible couplings, speed reducers are engineered to work as a team for peak efficiency.

Westinghouse gearing . . . including speed reducers and gearmotors . . . also makes an excellent choice for other applications throughout your paper mill.

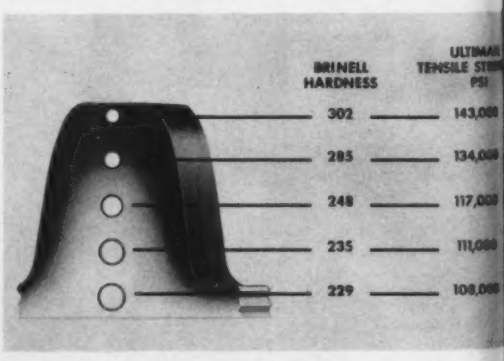
An experienced Westinghouse engineering team will work with your staff and consulting engineers on planning and maintenance throughout the drive assembly's lifetime.

Contact your Westinghouse sales office for further details. Ask for a copy of B-6109, *Magamp Sectional Drive for Paper Machines.* Or write, Westinghouse Electric Corporation, 3 Gateway Center, P. O. Box 868, Pittsburgh 30, Pennsylvania. MP-3045

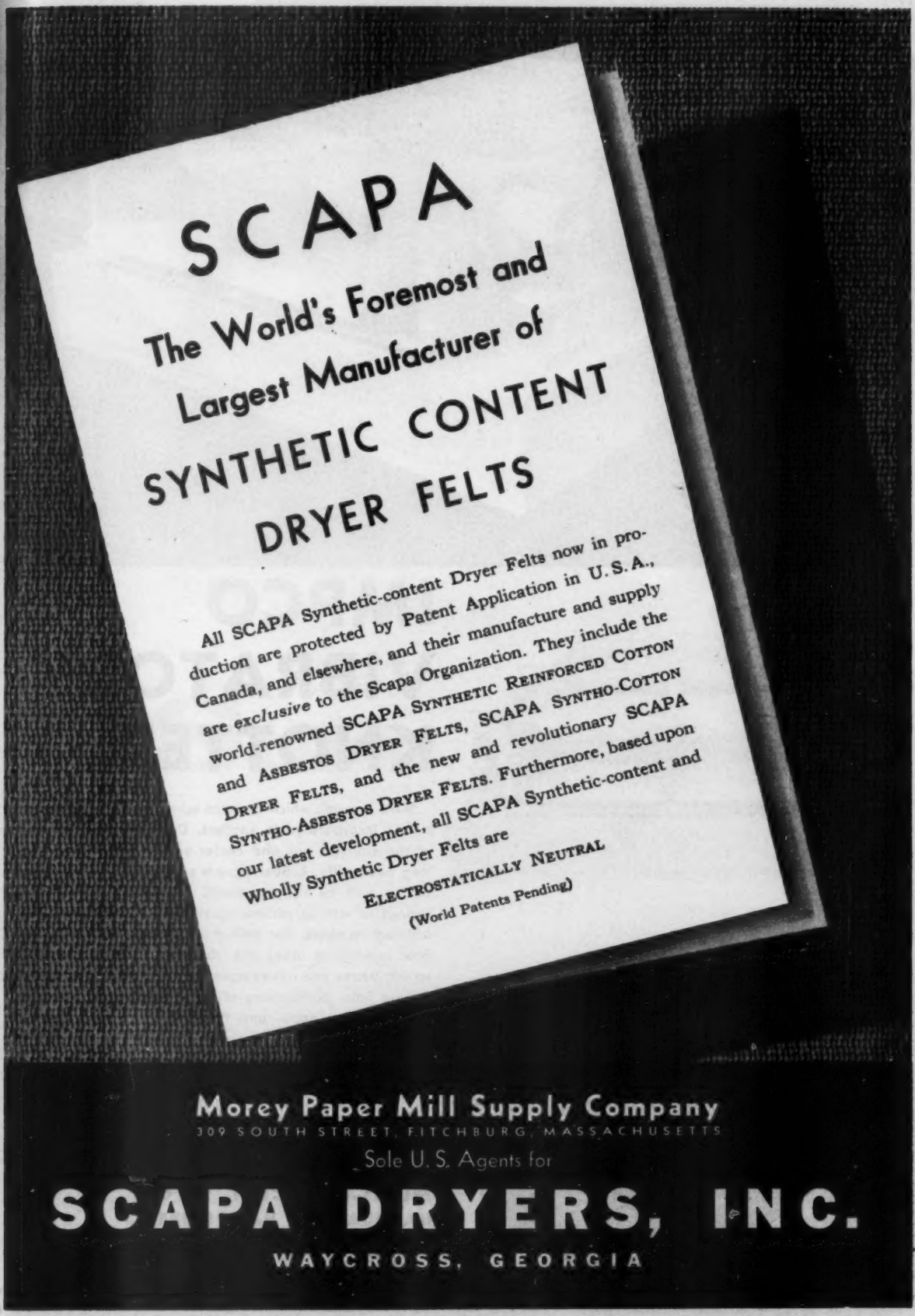


Single helical gear puts more teeth in action, provides greater load-carrying capacity and smooth, quiet operation. Top section of speed reducer split case can be removed for easy inspection and maintenance.

Tough outer surfaces reduce wear, resilient cores cushion operational shocks. All gears, shafts and pinions in Westinghouse speed reducers have this feature because of exclusive Westinghouse BPT heat-treating process.



WATCH WESTINGHOUSE *WHERE BIG THINGS ARE HAPPENING TODAY!*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The World's Foremost and Largest Manufacturer of
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All SCAPA Synthetic-content Dryer Felts now in production are protected by Patent Application in U.S.A., Canada, and elsewhere, and their manufacture and supply are exclusive to the Scapa Organization. They include the world-renowned SCAPA SYNTHETIC REINFORCED COTTON and ASBESTOS DRYER FELTS, SCAPA SYNTHO-COTTON DRYER FELTS, and the new and revolutionary SCAPA SYNTHO-ASBESTOS DRYER FELTS. Furthermore, based upon our latest development, all SCAPA Synthetic-content and Wholly Synthetic Dryer Felts are
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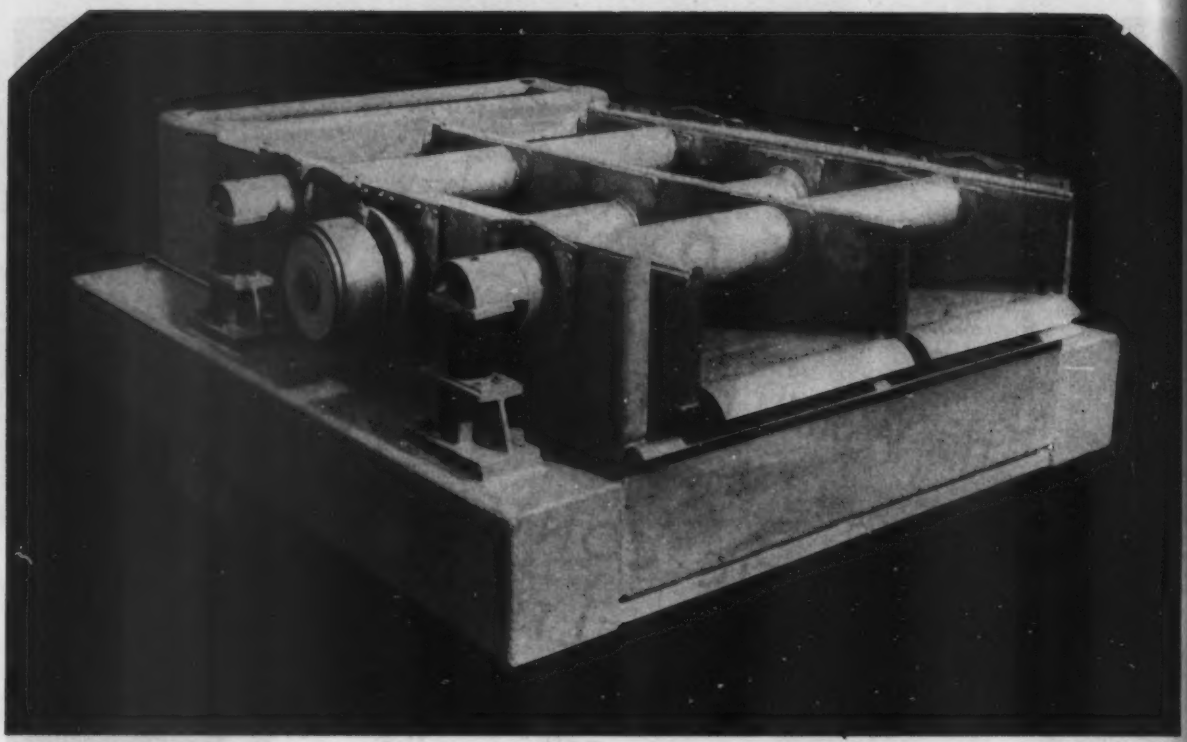

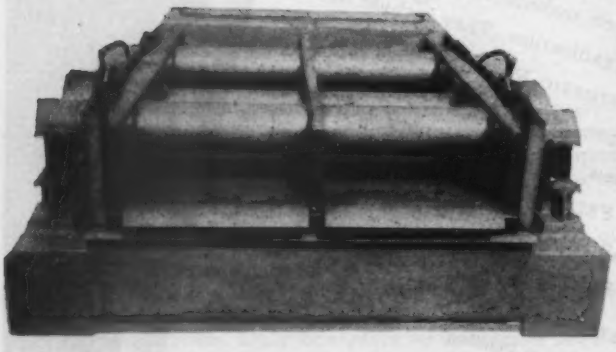

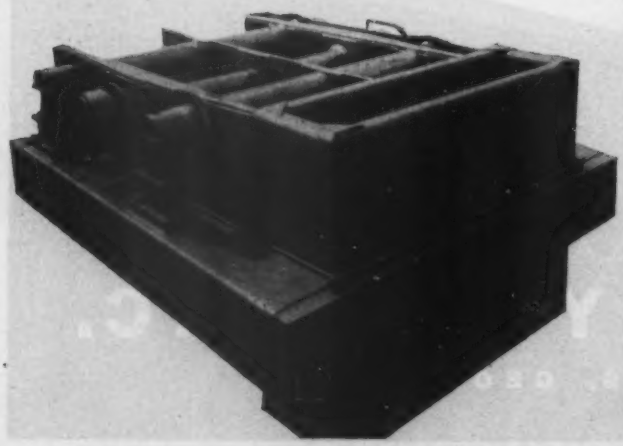

IMPCO VIBRATORY KNOTTER

Here is a unit which contains several new features never before incorporated in knotters. Double wall construction of the stainless vat and center section guarantees extra long basket life. Rubber mounts support the vibrating basket as well as the vat itself, eliminating old-fashioned springs as well as minimizing vibration transmission to the building members. The built-in inlet box lends itself to subfloor piping as does the discharge. Six sectionalized screen plates are advantageous in that plate changes for various fibre clarifications are easily made. Oil mist lubrication, proper seals, and flinger rings protect the antifriction bearings against water, cooking liquors, and hot vapors.

Largest plate area is in keeping with present day peak capacities.

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NASHUA, NEW HAMPSHIRE

IMPCO

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Baker Library
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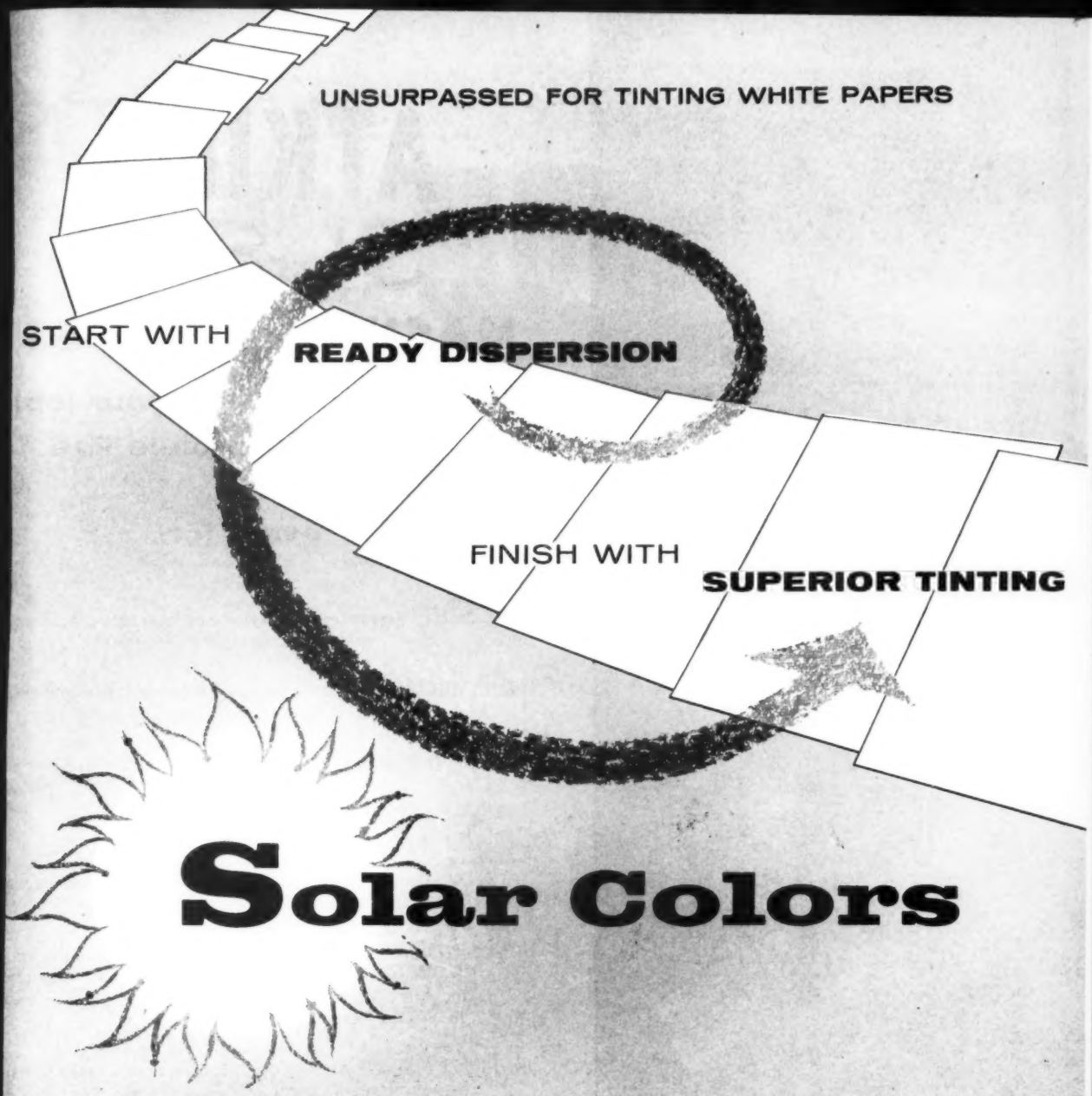

Solar Colors

Throughout the tinting process, the eight Solar colors are research-designed and specially standardized for optimum results. The Solar colors – soft, finely ground powders – are non-dusting and non-caking. They disperse readily whether added dry to the stock or in suspension. They assure quick wetting-out and uniform distribution.

Least affected by fluctuations in pH or temperature, the whole "Solar System" bestows superior tinting results—excellent lightfastness and brilliance of shade. They are unexcelled for process stability—at no extra cost. The Solar colors give white papers a visual lift without compromise.

A full range of eye-appealing whites are yours with Solar Blues and Solar Violets, alone or shaded with Solar Pinks and Solar Greens. We invite you to write for samples and technical information on *thoroughly* excellent tinting – with both tungstated and molybdated Solar colors.

Dyes Research to Stability

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Silver Steel®
MACHINE KNIVES

Built-in endurance for your job! Atkins offers a complete line of machine knives... ...a knife for every job.

Silver Steel Scientifically analyzed and specially processed for each particular cutting requirement.

Expertly Hardened Electric furnace-hardened under rigid control conditions insures rugged, long-life duty.

Specially Tempered Electronic controls regulate tempering to exact specifications for each knife . . . for each type of cutting.

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Precision Ground All Atkins knives are precision ground on the most modern machines available. Accuracy in beveling and keen cutting edges are always assured.

Protection Packaged Atkins knives are carefully packaged to insure complete protection in handling. The edges ride clear . . . never contact the packing case.

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You can't buy experience, but you can buy the result . . . Buy Atkins!

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Oh, Boy!

P

PRESENTING...

the NEW LINK-BELT MOTOGEAR

for bracket-mounting all foot-type NEMA motors—all makes and enclosures

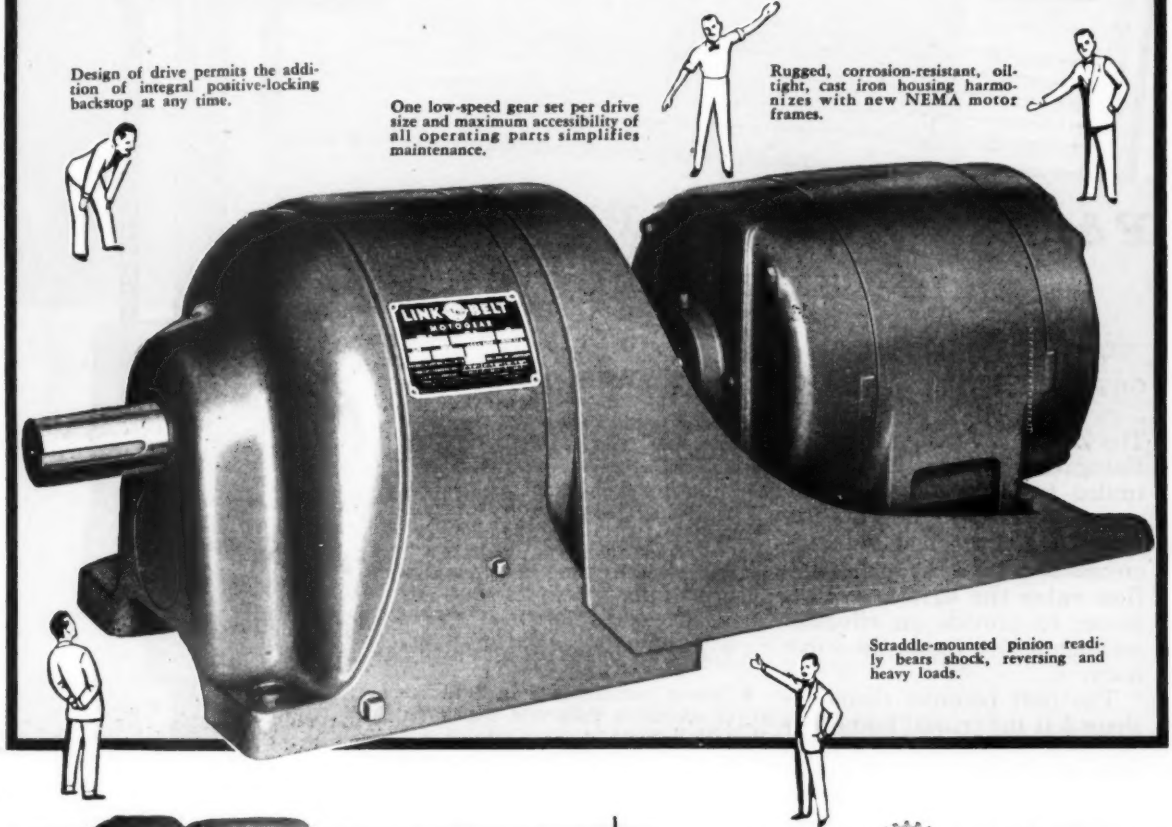
If drives in your plant operate continuously, the dependability of Link-Belt Motogears provides a sure means of minimizing costly, production-crippling downtime. Replacing a motor is simple and easy: just remove four bolts and separate the coupling—no need to drain oil. And design of the bracket assures rapid motor realignment. Sizes up to 60 hp; ratios from 6.2:1 to 292:1.

These are just a few of many advances in design you'll find detailed in 28-page Book 2447. Get a copy now from your nearest Link-Belt office or authorized distributor of Link-Belt products.

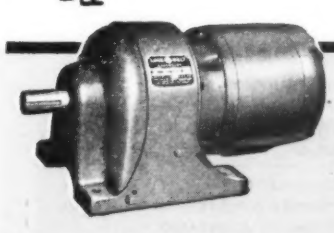
Design of drive permits the addition of integral positive-locking backstop at any time.

One low-speed gear set per drive size and maximum accessibility of all operating parts simplifies maintenance.

Rugged, corrosion-resistant, oil-tight, cast iron housing harmonizes with new NEMA motor frames.



Straddle-mounted pinion readily bears shock, reversing and heavy loads.



The new, improved Link-Belt line also includes compact Gearmotors with flange-mounted NEMA motors combining flexibility with outstanding design innovations.

LINK-BELT

ENCLOSED DRIVES

LINK-BELT COMPANY: Executive Offices, Prudential Plaza, Chicago 1. To Serve Industry There Are Link-Belt Plants, Sales Offices, Stock Carrying Factory Branch Stores and Distributors in All Principal Cities. Export Office: New York 7; Canada, Scarboro (Toronto 13); Australia, Marrickville, N.S.W.; South Africa, Springs. Representatives Throughout the World. 13,899

F & P Ratogate Non-Plugging Paper Stock Valve

"CONTROLLED TURBULENCE" AND DIAMOND-SHAPED PORT GIVE WIDE RANGE STOCK FLOW CONTROL WITHOUT PLUGGING

The Z-shaped body of the F&P Ratogate valve provides "controlled turbulence" to prevent paper stock from de-watering and plugging as flow rate increases or decreases. Even at low flow rates the agitation continues to provide an effective washing action inside the valve body.

The port becomes diamond-shaped at the critical lower portion of valve travel, affording the minimum perimeter for the area of opening. Easy passage of stock particles is assured over a wide flow range.

ONLY THE RATOGATE STOCK VALVE COMBINES THESE FEATURES

- ★ "Controlled Turbulence" washing action designed into Z-shaped body

  Rectangular port becomes diamond-shaped at low flow ranges for minimum perimeter-area ratio
- ★ Pneumatic or electric operation
- ★ Proven performance in hundreds of operating pulp and paper mill installations
- ★ Designed by a paper engineer for the paper industry

WRITE TODAY FOR COMPLETE DETAILS
ASK FOR CATALOG 60-12

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YARWAY DIGESTER BLOW VALVES with AUTOMATIC LUBRICATION

One of a battery of Yarway Digester Blow Valves, motor-operated, with automatic lubricators, in a large Washington pulp mill.

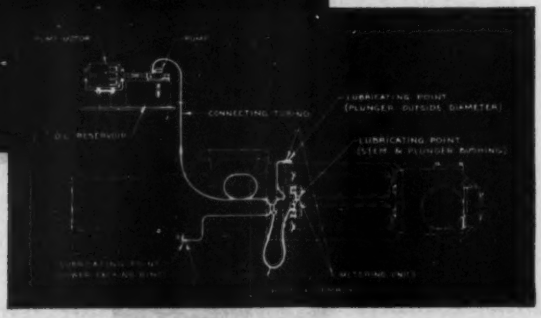

Diagram showing arrangement of Yarway Automatic Lubricator on Yarway Digester Blow Valve.

..help increase production, cut maintenance and save manpower

Automatic lubricators on Yarway Seatless Digester Blow Valves add new cost-saving and labor saving features to digester operation.

Push-button control of these valves also provides automatic lubrication of them at the *right* places . . . at the *right* time. Result—less maintenance, fewer production delays, release of manpower for other productive work.

Reports on low operating cost experiences from pulp mills using Yarway Digester Valves, are impressive, too. One large mill found the resultant *savings in operation and maintenance the first year more than paid for the cost of their new 4 Yarway Digester Valves.*

Yarway Seatless Digester Blow Valves are either motor or hydraulically operated. All are remote controlled—designed for clean, free discharge and tight shut-off.

For full information on Yarway Seatless Digester Blow Valves, write for Bulletin B-441. No obligation.

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DIGESTER BLOW VALVES

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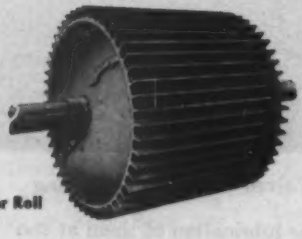
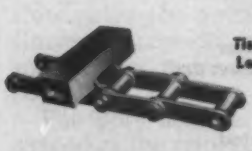
Tisco Demountable Plug Sleeve — only 3 bolts to remove



Tisco Beater Roll



Tisco Conveyor Chain with Log Haul Attachment

Tisco Manganese Steel Wear Parts have been famous for decades for their unequalled toughness and resistance to heavy impact and abrasion. In pulp and paper mill machinery, especially, their extraordinary lasting qualities have resulted in major savings in maintenance labor, down-time of machines and cost of replacement parts.

Within recent years Taylor-Wharton has developed new alloy steels with qualities pin-pointed to provide optimum resistance to varying degrees of impact, abrasion and corrosion. Whatever your requirements for materials of this kind it will pay you to consult Taylor-Wharton. Ask us to send one of our sales engineers to help you select the alloy steel best suited to your operating conditions.

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Ask for further information regarding TISCO Pulpwood Conveyor Chain, Barking Drum Chain and other chains, Jordan Plugs, Demountable Plug Sleeves and Liners, Beater Rolls and Bed Plates, Rag Slitters, Sprockets, and miscellaneous castings designed to meet your own operating requirements.

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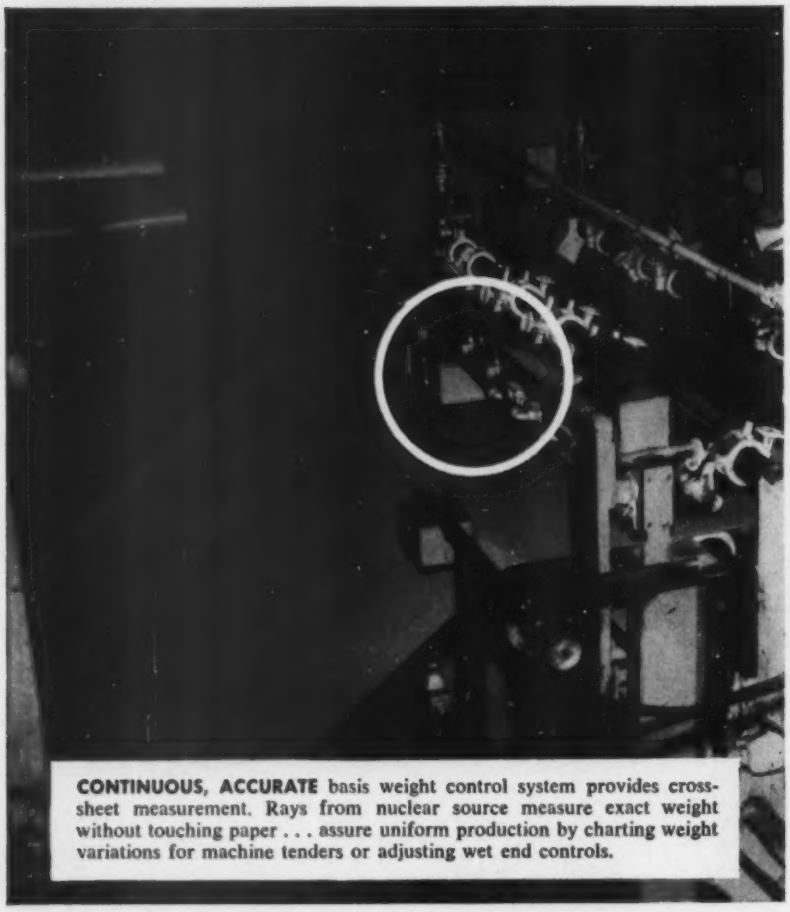
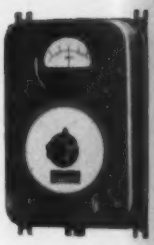


CONTINUOUS, ACCURATE basis weight control system provides cross-sheet measurement. Rays from nuclear source measure exact weight without touching paper . . . assure uniform production by charting weight variations for machine tenders or adjusting wet end controls.



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STRIP CHART RECORDERS present wet and dry end weights continuously. Fast speed recorders give expanded profile readings. Console design has drawer construction for easier maintenance.

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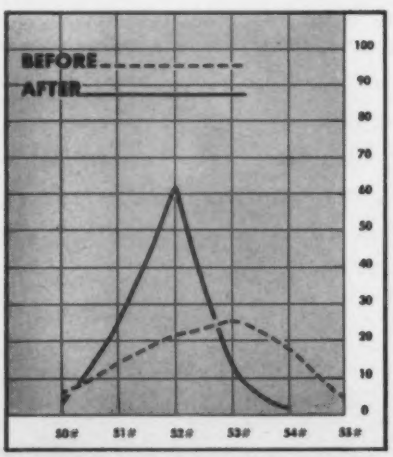

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Also, wet and dry end measurement permits accurate settings on all moisture extraction equipment – assuring the sheet will enter the driers in the driest possible condition. Machine speed may be increased or steam requirements lowered.

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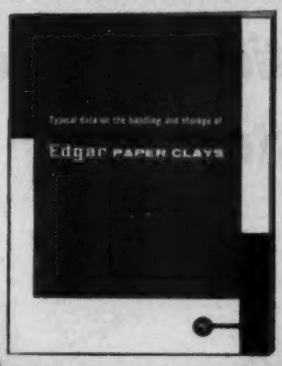

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Operation and equipment highlights at Eastex mill

While a fairly complete list of equipment and suppliers is appended to this article, the description in the text emphasizes highlight operations which incorporate many new improvements in design and performance.

THE EAST TEXAS Pulp and Paper Mill, which went into production in December, 1954, as a joint operation of Houston Oil Co. and Time, Inc., has since June 6, 1956, become a wholly owned subsidiary of Time, Inc.

The mill has a daily production capacity of 350 tons. Its products are chlorine dioxide bleached softwood and hardwood pulp, for the domestic and export markets and bleached paper and board for the manufacture of folding cartons, drinking cups, milk cartons, tags, file folders, and many other bleached board specialties.

Annual pulpwood requirements for the mill's production are: 240,000 cords of pine and hardwood which are procured (1) by independent wood contractors from individual tree farmers and land holders, (2) through the purchase of chips from saw mill waste, and (3) from the Southwestern Settlement & Development Co. which operates as a Division of the East Texas Pulp and Paper Co. The Southwestern Settlement & Development Co. owns 660,000 acres of timber lands on which modern scientific forestry methods are practiced. These include a continuous forestry inventory system of computing gross and net inventory and a seedling nursery supplying annually 15,000,000 seedlings for an annual minimum planting of 15,000 acres on tree farms.

Woodyard operations

Woodyard operations involve the processing of 600 cords of wood per day. The woodyard has a storage capacity of 20,000 cords, straw piled in two piles running on either side of a centrally located flume. The whole woodyard is paved with black top. A railway line bringing wood to the mill runs immediately alongside the flume.

The flume is built of steel-lined concrete. It is 750 ft. long and 3 ft. wide and equipped with a 4 ft. wide sloping apron on each side. Flume velocity is 5 ft. per second, the water flowing approximately 3 ft. deep. At the discharge end, the wood drops onto a conveyor which carries it to the barking drums. Loose bark and water pass through slotted holes in the conveyor bottom to a settling basin below, where it is removed by two heavy drag grit collectors. The bark and water passing

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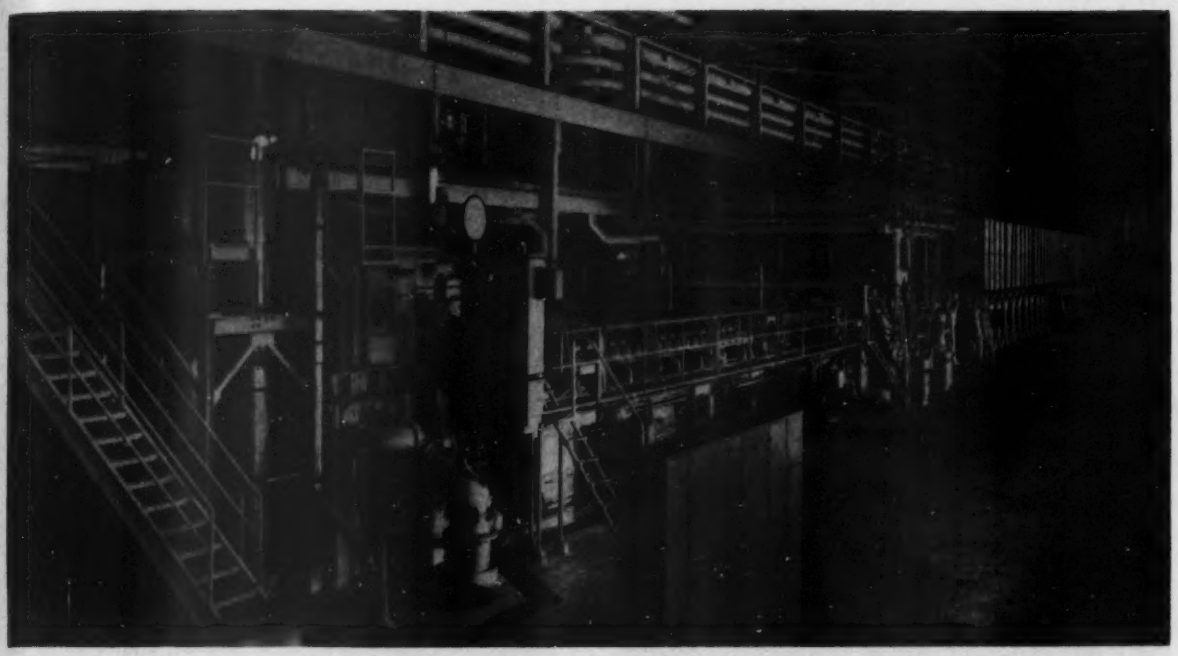

Wet end of the 216-in. Beloit fourdrinier machine

through the settling basin then reach two 10 ft., 7 in. diameter, 6 rpm vertical rotating circular coarse screens, where fine bark particles are removed from the flume water to the hog conveyor. The water which passes through the coarse screens is pumped by two, 10,000 gallons per minute, vertical pumps to the head end of the flume.

Logs are debarked in two 12 by 45 ft. drums of the chain-suspended pipe.

The debarked logs leave the drum on a 2 ft. wide chain conveyor which carries them to a spiked rollcase. The rollcase is made up of twelve 10 in. diameter spiked rolls divided into 4 sections of 3 rolls each. Each successive section of rolls is driven faster than the one preceding it. This has the effect of pulling logs out of the bunches in which they often arrive to give a more steady and even flow. Another function of the rollcase is to discharge the even flow of logs in such a way as to place them crosswise on the take-away conveyor which supplies the 60 in sorting belt conveyor.

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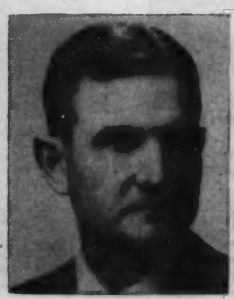

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The crosswise arrangement of the logs on the sorting belt conveyor permits the latter to move at a speed of only 50 fpm while still handling over 40 cords of wood per hour. At this low speed, two men are able to handle the sorting with ease.

At the end of the sorting conveyor, the logs drop to a flat 24 in. belt conveyor which feeds the chipper.

The chipper is a 102 in., 10-knife machine driven by a 700 hp., 327 rpm, 300 per cent pull out torque synchronous motor. The chips are discharged through a cyclone to a flight conveyor which distributes them to a surge bin over the three chip screens. The surge bin has a capacity of 15 units. Three rotary vane feeders, each about 36 in. in diameter having a capacity of 20 units of chips per hour (200 cu. ft. per unit) and equipped with a P.I.V. variable speed drive, are feeding chips into three Rotex type chip screens. Accepted chips from the screens are conveyed to three chip silos by means of a 30 in., 45° troughed belt.

The silos are 40 ft. in diameter and 70 ft. high, each with a capacity of 250 units.

At the bottom of each silo is a 17 ft. diameter rotary plate feeder, which handles wood chips from the silos to the belt conveyors. Each of the three rotary plate feeders has a capacity of 140 units of chips per hour at an operating speed of about 5.2 rpm.

Three belt conveyors, arranged in series, carry the chips from the silos to the digesters. Chips are electrically weighed and measured on the second belt, while the third belt which runs over the top of the digesters discharges chips into a motor propelled tripper.

Screened chips brought in by truck trailers are dumped by crane into a large hopper. A traveling chain in the bin bottom feeds the chips, at the rate of 30 units per hr., to a chip blowing unit which blows the chips through a single 14 in. pipe over a distance of 450 ft. to the chip silo. The capacity of the Airveyor system is 30 units per hour. The blower is an 18 by 27 type RCDH machine, driven by a 150 hp., 1200 rpm motor. The whole system is located close to the Chip Screen Building so that, if desired in future, unscreened chips can be brought in and bypassed to the chip screens.

Digesters

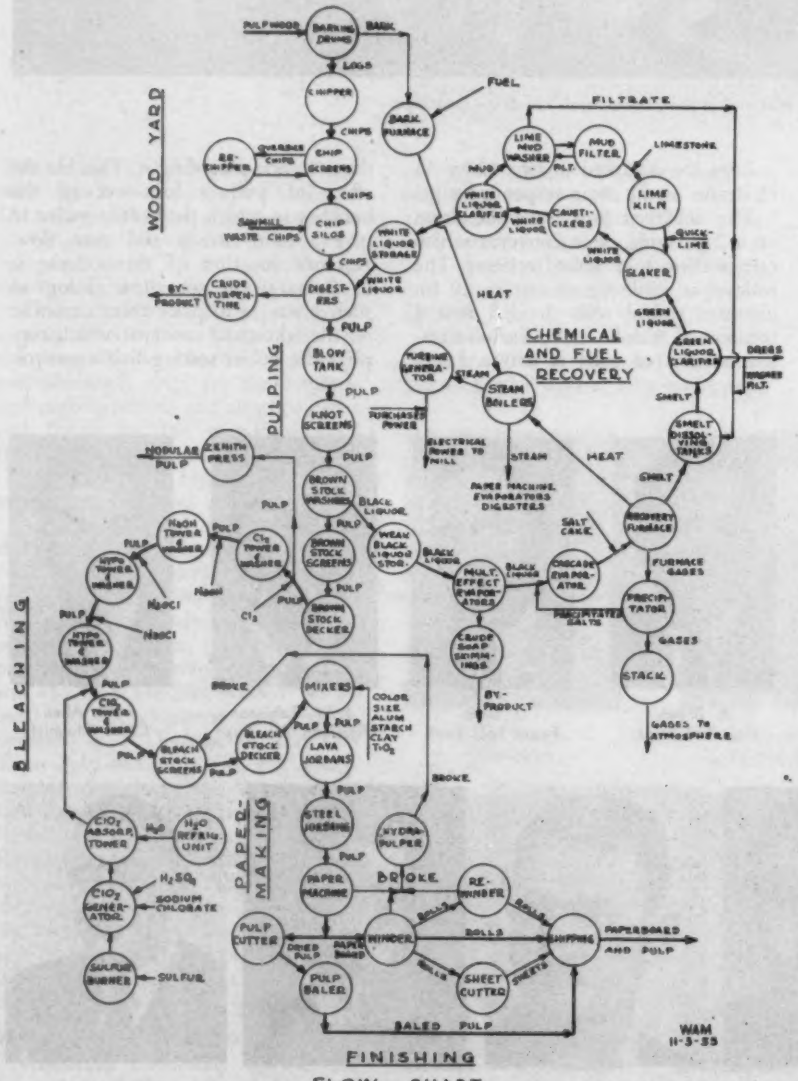
Five 4,800 cubic ft. capacity digesters, measuring 11½ ft. inside diameter and 54 ft. overall length, are designed for 150 psi working pressure. The digesters were shop assembled, stress relieved, and X-rayed before shipment. They are made of A285 grade B fire box steel with a 2 in. thick shell and bottom cone and a 2 in. thick ellipsoidal top.

The digesters are equipped with a circulating and indirect heating system consisting of three principal parts:

(1) *Digester strainers.* There are approximately 28 strainer sections per digester made of solid 18-8 stainless steel and completely encircling the inside diameter of the digester at the approximate mid point. The strainers are held in place with stainless steel supporting blocks and are easily removable for cleaning or inspection.

(2) *Digester indirect feeders.* All parts of the heat exchangers in contact with the liquor are of solid stainless steel so that cleaning acids can readily be used for removing scale from the tubes. The heater shells have a built-in expansion bellows which eliminates the need for an internal floating head and the consequent possibility of gasket leakage and condensate contamination. The heater flanges are tongue and groove gasketed joints. The digester piping is so designed that cooking may be done either directly or indirectly.

(3) *Digester circulating pumps.* Recirculated liquor is introduced at both top and bottom of the digester and withdrawn at the center. The pumps, made of stainless steel castings, are of "double volute" design and have an improved stuffing box which is simpler and easier to maintain than those used in the past. The packing is both water sealed and water cooled. The pumps embody a spacer type coupling so that the complete rotating element



FLOW CHART
KRAFT PULP & PAPER PROCESS

View of the two Fibre Making Processes 12- by 45-ft. chain-suspended barking drums

View of digester floor showing four Chicago Bridge & Iron Works' digesters, liquor-charging system, and instrument panel

View of Impco bleach system, showing (left) bleached pulp washers, (background) chlorine dioxide stage, (right) unbleached pulp washers

View of eight E. D. Jones & Sons Co.'s lava-filled Majestic jordans with multiple pipe arrangement

View of Beloit Iron Works' twin open-side type calender stacks enclosing three inter-calender dryers and coater

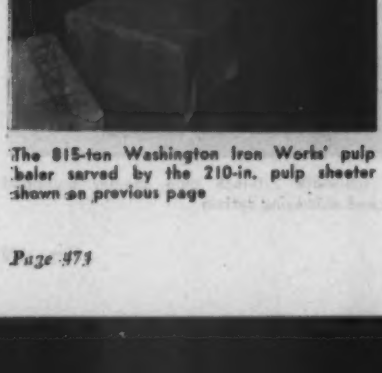
Lamb-Gray's Harbor full-width 210-inch pulp sheeter equipped with automatic layboy and conveying system

Close-up of No. 8 Dorr-Oliver lime slaker in the recausticizing system

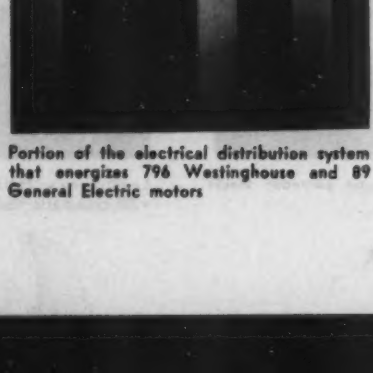
View of instrument panels controlling the liquor recovery furnace

View of Dorr-Oliver continuous recausticizing system; to left are white liquor clarifier, lime mud washer, green liquor clarifier and three causticizers

Close-up of 6- by 6-ft. Dorr-Oliver lime mud filter showing thick cake discharging into screw conveyor



The 815-ton Washington Iron Works' pulp baler served by the 210-in. pulp sheeter shown on previous page



Portion of the electrical distribution system that energizes 796 Westinghouse and 89 General Electric motors

including bearings can be removed from the back side of the casing without disturbing the piping connections.

Hot vapors coming from the digesters during filling operation are removed from the building by means of a tripper chute exhaust system. This system consists of an exhaust fan and the necessary duct work to exhaust from the tripper chutes. The system is unique in that there is an automatic damper above each chute so that air is being exhausted only at the chute which is being charged. This substantially decreases the amount of air to be handled.

Gases from the blow tank pass through a heat recovery system which consists of vertical direct contact jet condenser and a water accumulator tank. The heated contaminated water is pumped through two indirect tubular heat exchangers which heat fresh water to be used in the stock washing operations.

A turpentine recovery system recovers turpentine from the digester relief gases.

Digester operations are controlled by six control panels. The main panel has integrating meters for total steam flow and chip weight to provide figures for accounting, and liquor measuring and blow heat recovery controls. The five cooking panels, one for each digester, provide for automatic digester steaming and relief control, automatic steam blow-back for the neck strainer and records of steam flow, digester temperatures and pressure, liquor temperature, and relief valve position.

Pulp washing and bleaching

Weak black liquor from the brown stock washing system is used to dilute the stock for pumping to three Jons-

son knotters equipped with stainless steel plates having 3/8 in. diameter perforations and mounted on vibration dampers. Stock from the knotters flows by gravity into a line of brown stock washers consisting of three 9½ ft. diameter by 16 ft. face molds with submerged type intermediate re-pulpers. The washers are equipped with a variable speed dc. drive with the rheostats located at the washer control panels. Washers and knotters are covered by a common hood of steel and transite equipped with wide overhang and deep curtains and exhausted by two 48 in. fans.

The washed brown stock is discharged by a shredder conveyor combination to a flat rubber conveyor belt which transports stock to two 35 ton tile high density storage tanks equipped with Kamyr tangential agitators. From the high density storage tanks, stock is pumped to a blending tank 38 ft. in diameter and 30 ft. high.

The blending tank is equipped with a two-stage vertical agitator and is designed to blend unbleached kraft stock at a consistency of 3 per cent. The blended stock is pumped to eight rows of Cypress vat flat screens containing a total of 24 flat screens, each of which has 14 plates.

The accepted stock passes through Cypress flumes to a 9½ ft. diameter by 16 ft. wide face steel rotary vacuum type valveless filter where it is thickened to approximately 4 per cent consistency. The thickened stock discharges directly into two concrete tile-lined Decker chests, each holding approximately ten tons of stock. The Decker chests are equipped with horizontal propeller-type agitators.

Stock from the brown stock Decker chests can be pumped to a five-stage bleach plant, or directly to the bleach Decker chests from where it can be fed to the paper mill for use in making brown stock grades of paper.

The bleach plant consists of a chlorination stage, the caustic extraction stage, two hypo stages, and a high density chlorine dioxide stage.

The chlorination tower is of the Kamyr design. It is of 15 ft. inside diameter, and has a height of 70 ft. It is fabricated from ½ in. steel plate and tile-lined with Asplit pointing. Stock flows by gravity into the chlorination washer. All five washers are 8 ft. in diameter by 16 ft. face and they are equipped with variable speed drives. The washer vats are of tile construction. All five washers are equipped with centrifugal-type open discharge seal tanks to provide maximum separation of air and filtrate.

From the chlorination washer, stock discharges by gravity into a mixer where caustic and steam are introduced.

Stock from the fourth washer discharges into a double mixer for steam heating to the required temperature, and discharges by gravity into a stock pump which forces the stock at approximately 40 lbs. pressure through a Hastelloy chlorine dioxide mixer. It then flows upwards at approximately 12-14 per cent consistency through a preretention pipe approximately 4 ft. inside diameter and 80 ft. high.

The preretention pipe discharges the stock into an 18½ ft. diameter by 70 ft. high downward flow high density tower. Both preretention pipe and the chlorine dioxide tower are lined with an acid brick laid polyester cement. Stock from the bottom of the chlorine dioxide stage is pumped back to the fifth washer made of stainless 317, extra low carbon construction. SO_2 is also added to the showers at this last washer stage.

The bleached stock is then transferred by conveyor belt to two 35 ton, tile construction, high density storage tanks.

Exhaust gases from the bleach washer towers and seal tanks are discharged by a hard rubber covered fan into a 60 ft. high, 7 ft. diameter wood stave stack located on top of the flat screen building.

The bleach plant ventilating system consists of (1) The operating floor roof system apparatus which supplies air through duct work to the room through grilled outlets. The air going to this system is heated, filtered, and the temperature controlled by the V-port valve. The air filter is of the self-cleaning oil type. (2) The operating floor air make-up unit equipped with an Axial flow type supply fan distributes air to the room through a grilled outlet, and the air is heated and filtered through an automatic self-cleaning oil pipe air filter.

From the high density storage, stock is pumped back to the bleached flat screens systems arranged in four rows, three primary rows and one tailings row. From here, the accepted bleach stock passes through Cypress flumes to a stainless steel rotary-type valveless filter. The bleach flat screen headbox is equipped with a caustic Rotometer for neutralizing the SO_2 which was introduced in the last stage of washing.

Black liquor recovery system

Weak black liquor is pumped to the sextuple effect evaporator, designed to concentrate 475 gpm of liquor to 50 per cent solids content and equipped with surface condenser. A soap tank is located between the fourth and third effects. A flash tank after the 1A effect, recovers sensible heat used for evaporation in the evaporators. Operation of the evaporator is from the recovery furnace floor, with the instrument panel located beside the recovery control panel. East Texas was one of the first to locate the panel at this point.

Special alloy centrifugal pumps transfer the liquor between effects and concentrated liquor from the flash tank to the storage tank. At present the unit is operating at 25 per cent greater than design capacity while still evaporating more than 5 lb. of water from the weak liquor for each pound of steam supplied.

The concentrated black liquor from the black liquor storage is pumped to the precipitator. The precipitator is of double chamber design to permit bypassing of one chamber. Gas flows horizontally through the precipitator and as an aid to uniform gas distribution, perforated plates are installed in vertical planes across the precipitator at inlets and outlets.

Each chamber has two separately energized electrostatic fields, arranged in series. The discharge electrodes, which are mounted in pipe frames, are manufactured of 5/32 inch square stainless steel wire. The collecting electrodes, which are manufactured of 14 gauge mild steel, are arranged to form 34 parallel gas lanes, 17 in each of the two parallel chambers.

Automatic rapping mechanism for the discharge wires, collecting electrodes and perforated plates are of the pneumatic type. To minimize the possibility of re-entrainment of dust during the rapping period, only the collecting electrodes of one field in one chamber are rapped simultaneously during the rapping period.

Beneath the two electrostatic fields of the precipitator are two drag scrapers (one per chamber) to carry the collected salt cake toward inlet end of the precipitator. Below the drag scraper, at the inlet end of each chamber, a shallow hopper is provided for the hydraulic removal of dust. One of the advantages of this system is the fact that the precipitator bottom is still of the dry type because the black liquor is confined to relatively small and accessible conduits comprising piping and the flushing troughs.

The precipitator is equipped with 16 steel enclosed suspension insulators (8 per chamber) and 4 steel enclosed insulators (2 per chamber) for high tension cable terminals. The

suspension insulators and the pothead compartments are heated by hot air system which eliminates waiting periods for starting the precipitator.

With the precipitator dust added to the black liquor, the latter passes to the cascade evaporator. This evaporator consists of two wheels in parallel, each wheel is 14 foot in diameter and has a width of 8 ft.

Black liquor leaves the cascade evaporator at approximately 68 per cent solids concentration. It passes over the weir plate in the flow box and then through a motor-driven rotating cylindrical strainer. The strained liquor then flows by gravity into the salt cake mixing tank and then to a direct contact steam heater. A centrifugal pump of special alloy construction, and powered by a 40 hp motor through a fluid drive, pumps the concentrated liquor through another direct contact steam heater and then to the header which supplies the liquor spray guns.

Admission of air to the lower zone of the recovery furnace is controlled in such a way as to sustain combustion, but at the same time maintain essentially a reducing atmosphere under which conditions a maximum conversion of chemicals takes place. More air is admitted to the upper part of the furnace where combustion is then completed.

The furnace is a three drum recovery unit incorporating such features as a water cooled decanting hearth and tangential tube super heater construction. The furnace is followed by a two-pass boiler, and the last pass consists of a six row finned tube integral economizer. The design capacity of the recovery unit is 900,000 lbs. of dry solids per 24 hours. The design pressure is 675 psi and the total steam temperature 750°F. Steam production is 132,000 lbs. per hour.

Recausticizing system

Green liquor from the dissolving tank in the recovery system is pumped through a 26 ft. by 24 ft. green liquor clarifier of the new unit compartment design, recently adapted as the standard design for this type of equipment. The clarified liquor is stored in a 75,000 gallon tank. It is then pumped through a No. 8 lime slaker and then to three 10 ft. by 11 ft. (1,000 cubic ft.) agitated continuous causticizers located on the mezzanine floor above the clarifying tanks to permit gravity flow to the 26 ft. by 20 ft., four-compartmented white liquor clarifier. The clear white liquor is stored in two 75,000 gallon white liquor storage tanks. The causticizers are stainless steel lined with portland cement bottoms.

The lime mud washer is a four-compartmented, 26 ft. by 20 ft. unit equipped with under-flow pumps. Lime mud is stored in a 30,000 gallon tank equipped with an 18 ft. by 15 ft. lime mud agitator.

The 6 ft. by 6 ft. lime mud filter is equipped with an L-7 vacuum pump. From the mud filter, lime mud is discharged by a screw conveyor into an 8 ft. diameter by 250 ft. long heavy-duty rotary lime kiln.

Burned lime is discharged from the kiln into a totally enclosed pit in which is installed a hot lime drag conveyor mounted in a trough of hard nickel alloy construction. The drag conveyor discharges into a hot lime vertical centrifugal discharge bucket elevator which drops the lime into the top of the 4,000 cubic feet hot lime storage silo equipped with a screw feeder in its conical bottom. All of the hot lime handling equipment is carefully sealed and vented to eliminate dust seepage into the building.

Stock preparation

Sulfate pulp, broke, size, and alum is fed from outside storage tanks into four tile-lined mixing chests, to which are also added dyes and starch from tanks located inside the stock preparation area. All materials added to the mixing chests are handled by an automatic proportioning system featuring control valves and flow meters. After a 25 minute cycle of dumping, filling, and mixing, the stock is dumped into a tile-lined dump chest.

From the dump chest it is pumped continuously to three Majestic lava-filled jordans which discharge into a beater chest. Half of the stock flow, the machine wet broke, and white water are circulated from the beater chest through a 9½ ft. by 16 ft. save-all, which discharges back into the same beater chest. From this chest the stock flow also continues through 5 more Majestic jordans, three of which are provided with wide and two with narrow tackle. From these jordans the stock goes to the machine chest.

The paper machine

The paper machine is a 216 in. fourdrinier general purpose board machine with operating speeds up to 1500 fpm. This machine represents important advancements in the production of bleached board grades.

The machine has an air-cushioned inlet to facilitate the production of a high quality level sheet. Stock passes through an air motor-operated stream flow valve, and is introduced into the headbox through a patented cross-flow distributor.

In the headbox, a constant level is maintained by means of either air pressure or partial vacuum. Five self-cleaning rectifier rolls of the latest design aid in keeping the stock fibers evenly dispersed—allowing the stock to flow cleanly through the headbox. The distributor and headbox are completely lined with stainless steel.

The fourdrinier is designed to carry a wire 216 in. wide and 130 ft. long. The fourdrinier section is removable as a complete unit with all the table rolls, inside wire rolls, save-alls, and suction boxes. At the wet end of the machine all surfaces exposed to stock and white water mist are completely protected against corrosion.

The dandy roll is covered with a fine bronze wire and is complete with an oscillating shower. The fourdrinier is also serviced by a patented air-operated wire guide.

The latest design is employed in the centrifugally cast bronze suction couch roll. The suction couch roll has a double suction box complete with air loaded packing, so arranged that one area can be cut off giving an equivalent box of lesser suction area for a lighter weight sheet. The suction couch roll is cantilevered during wire changes.

Modern design is also the hallmark of the press section. It consists of one straight through suction press, and inverse press, a plain straight through hot press, and a smoothing press.

The suction rolls are made of centrifugally cast brass, rubber covered, with air loaded packing construction. They are carried in heavy duty anti-friction bearings. Each suction press roll is equipped with a stainless steel save-all.

The plain press rolls are rubber covered and are of extra heavy construction. Anti-friction bearings are used throughout. Air loading equipment is arranged so as to apply and regulate nip pressure between the top and bottom rolls.

Vacuum is supplied by a size 10 by 25 and a size 14 by 29 type RCV single stage vacuum pumps and a size 20 by 50 by 18 by 32 and size 14 by 29 by 12 by 20 type RCV-2 compound vacuum pumps. These pumps handle a total of approximately 22,000 cfm of air and provide a vacuum from 8 to 20 in. mercury.

The dryer section is divided into four separate sections with a total of 59 paper dryers of the latest high-pressure design. The dryer section is arranged as follows: (1) a 6-drum

pre-dryer section, (2) third press, (3) smoothing press, (4) 20-drum dryer section, (5) breaker stack, (6) 22-drum dryer section, (7) size press, and (8) 11-drum dryer section. The dryer section is also equipped with four top felt dryers, 4 top Feeney dryers, three bottom felt dryers, and 4 bottom Feeney dryers.

The dryers are provided with high speed condensate removers, and duplex steam fits. The dryer drainage system includes six flash steam separators, a receiver, and four condensate return pumps. A condenser mounted at the wet end together with a vacuum pump help to establish low terminal pressures, evacuate non-condensibles, and facilitate starting operations. All automatic temperature control instruments are mounted in panel boards suitably located for easy supervision of the drying operation. A cascading effect is applied to utilize flash steam and dryer groups of lower pressure to increase efficiency.

The rolls of the breaker stack located between the second and third dryer section, are rubber covered and the stack is air loaded to assure proper nip pressures. Size press rolls are also rubber covered and the nip pressure is held by air operated diaphragm assemblies. The size pan and shower pipes are manufactured of stainless steel.

Automatic felt stretchers and automatic air guides are provided throughout the press and dryer sections to help insure proper felt operations and long felt life.

The twin open side calender stacks are of the latest high-speed design and all rolls except the bottom rolls are carried in anti-friction bearings. The bearing housings are carried in arms pivoted from adjustable mountings on the calender stack. All calender stacks are provided with flexible doctor blades. The doctor mountings are attached to the bearing housings of each roll and are loaded. Bottom roll doctors are of the air-loaded oscillating type.

Three high-pressure intercalender dryers drums are located between the calender stacks. These dryers are complete with steam fits and condensate removing equipment. Power for these dryers is delivered directly from the calender.

Between the twin calender stacks is also located a Faeber-type coater.

Following the calender stacks, is the 88 in. heavy duty pneumatic reel. This reel, through a controlled nip pressure, has accurate contol of roll hardness in both the starting and secondary positions. A heavy duty unwind stand has necessary adjustments to align the reel spools across the machine and in the machine direction.

The 60 in. model "L" winder is equipped with a single motor type drive, roll ejection motor, and slitter motor. Roll ejection equipment, shaft pullers, and roll lowering table of the latest design have been installed. Effective adjustments of relative speeds of the drums give complete control of the hardness throughout roll set. Clean cutting shear slitters hold initial settings. Winder drum grooving with adjustable bow spreaders and a "D" shaped spreader bar for localized control spread the sheets as desired.

The paper machine is driven by a 1500 hp turbine through an enclosed differential mechanical drive. Separate differential gear units connect the paper machine with the drive at the couch, first press, second press, third press, smoothing press, first dryer section, second dryer section, breaker stack, third dryer section, size press, fourth dryer section, the two calender stacks, and the reel. Clutches are of the latest multiple disc air-operated type, with all controls for operation located at the front side of the machine.

Lubrication for the entire machine is provided by a Bowser oiling system.

The dry broke handling system includes a chest located between the calender foundations extending from the dryer pit to the reel slot. This chest is tile lined concrete, except for steel panels bove the liquid line on the ends. At the dryer end, a 4 ft. conveyor transfers the broke from the floor underneath the dryer into the chest. The chest incorporates two 16 ft. long No. 4 Pulpmaster assemblies. Any tendency for the dry broke to float is eliminated by the use of heavy broke sprays recirculated from the extraction pumps.

Machine hood and room ventilating systems

The paper machine hood is of Transite and steel construction and has a wide overhang and deep curtains to insure catching the vapors. There is also a similar hood over the calender dryers. The exhaust fans are of the Axial flow type, 8 on the main hood and one for the calender dryer. These fans have 3-bladed cast aluminum wheels and stainless steel shafts.

There are four wet end summer ventilating units, two of these supply filtered and heated air through the machine roof, and two exhaust from the room and are mounted in Transite and steel pent houses.

There are two bottom felt systems supplying controlled heated and filtered air through standard nozzle pipes along the return bottom felt.

There are three heating and ventilating systems which supply air to the roof of the machine room. This air is filtered and heated and distributed through the diffusers to the ceiling to prevent moisture condensing in the pockets formed by the roof construction. The temperature of the air is controlled by the use of V-port valves. The Ross Grewin system is of standard construction of spiral welded pipe over to the machine and all branches and drops on the machine are streamlined copper tubing and fittings with nozzles of the adjustable cast brass type. The apparatus for this unit consists of a filter, a centrifugal compressor, a bank of heater coils and the necessary controls and pressure gauge.

Three air make-up units supply air to the room and to the basement. Two are located on the mezzanine at the back side of the machine and one is located in the basement toward the wet end. Each of these units has automatic filters, heaters, and two axial flow type supply fans.

The dry end summer ventilating apparatus is located in the basement and consists of automatic filters, heaters, and two supply fans. A duct work underneath the operating floor distributes air into four grilled outlets protruding above the floor in the aisle at the wet end.

The calender cooling system is of the low pressure type. It has a filter of the automatic type and the air is supplied through a Sturtevant industrial blower, to manifolds beneath the calenders with outlets directing the air at the nips. There is also a hot air system between the calenders for the purpose of drying the coating.

The trim conveying system is of the injector type and includes a fan ahead of the injectors picking up the trim from the winder and delivering it to the sludge maker. This system will handle up to a maximum of 3 in. wide trim from each side at speeds up to 4,500 fpm.

Finishing

From the calenders, the sheet may be reeled for further roll finishing. However, if required, the sheet can be carried over the reel through a floor slot directly to a 210 in. pulp cutter and automatic layboy and conveying system. An 815-ton baling press services the baling line.

After reeling, a separate 16-ton bridge crane transfers the reel to the winder. The core-pulling conveyor transfers the set of rolls to a levelator which lowers the roll set to the floor. The finishing line equipment at floor level includes glue buggies, wrapper rolls, overhead backstand and header. Provision is made in the 84 in. header so that it can be opened up to 12 ft. to allow 10 ft. rolls to bypass the roll wrapper system.

A Lowerator in the wrapping line is designed to lower a maximum of 640 rolls per 8 hr. day from the upper to the lower floor level. The Lowerator handles rolls ranging from 24 in. to 60 in. in diameter and from 3 ft. to 10 ft. long, ranging in weight from 520 lbs. to 10,800 lbs. The Lowerator is fully automatic in operation after initial manual start and continues to operate automatically as long as paper rolls are fed to the loading position. The lowering tray operates at about 75 ft. per minute.

The Lowerator discharges rolls to the warehouse where they are taken to the 12-roll revolving backstand of the 120 in. duplex rotary cutter and layboy. Near this cutter, an 85 in. hydraulic trimmer prepares the stock before going to the sorting and wrapping benches.

Water supply

The daily water supply of 24,000,000 gal. comes from eight deep wells. This water has a low content of solids and chlorides, making it readily adaptable for papermill operations.

For boiler make-up water, a two-bed demineralizing system of six units is used. In the first stage, the cations — calcium, magnesium and sodium — are removed, and the water is then passed through a decarbonator and on to the second stage. In the second stage, the anions — silicate, sulfate, chloride, etc. — are removed. Make-up water is then added to the condensate and the 300-lb. per hour capacity deaerator.

The demineralizing unit has a capacity of 200 gpm and is capable of supplying 100,000 lb. make-up water per hour. Feedwater from the deaerator is delivered at 290°F. to the boiler feed pump.

Principal equipment and suppliers at Eastex mill

Woodyard operation

Airveyor system (1) single pipeline, 30 units per hour capacity ..... Fuller Co.
Barker drums (2), 12 x 45 ft., chain suspended type ..... Fiber Making Processes Inc.
Chip blower (1), 18 x 27 RCDH type ..... Roots-Connersville Blower Corp.
Chopper (1), 102-in., 10-knife ..... D. J. Murray Mfg. Co.
Disc screens (2), 10 ft. 7 in. diam., 6 rpm. ..... Link-Belt Co.
Motors (48) ..... Westinghouse Electric Corp., General Electric Co.
Pumps (2), vertical, 10,000 gpm ..... Bingham Pump Co.
Pumps (4) ..... Worthington Corp.
Rotary plate feeders (3), 17-ft. diam., 140 units per hr ..... Link-Belt Co.
Rotary vane feeders (3), 36-in. diam., P.I.V. var. speed drive, 20 units per hr. capacity ..... Link Belt Co.
Rechipper (1), ... Carthage Machine Co.
Rubber belting, for belt conveyors ..... Goodyear Tire & Rubber Co. Inc.
Screens (2), Rotex type, 20 units per hr. ..... Orville Simpson Co.

Digester area

Blow tank heat recovery system ..... Foster Wheeler Corp.
Digesters (5), 11½ × 54 ft., 4,800-cu. ft. capacity ..... Chicago Bridge & Iron Co.
Digester blow valves ..... Yarnall-Waring Co.
Digester circulating pumps (5), double volute design, ESCO stainless steel castings ..... Bingham Pump Co.
Digester indirect heaters (5), stainless steel, with built-in expansion bellows ..... Electric Steel Foundry Co.
Digester strainers (28 per digester), 18-8 stainless steel ..... Electric Steel Foundry Co.
Motors, electric (30) ..... Westinghouse Electric Corp., General Electric Co.
Pumps (15) ..... Bingham Pump Co., Worthington Corp.
Tripper, motor-propelled ..... Chain Belt Co.
Tripper chute exhaust system, with automatic damper ..... J. O. Ross Engineering Corp.

Pulp washing and bleaching

Agitators (2), Kamyr tangential ..... Sandy Hill Iron & Brass Works
Agitator (1), two-stage vertical ..... Bingham Pump Co.
Agitators (2), horizontal propeller type for Decker chests ..... Shartle Bros. Machine Div., Black-Clawson Co.
Bleach plant, 5-stage ..... Improved Machinery Inc.
Bleach plant, chlorination tower, Kamyr design, 15 × 70 ft. ..... Sandy Hill Iron & Brass Works
Brown stock washers (3) with 9½-ft. diameter by 16-ft. face molds; Reliance variable speed drives ..... Improved Machinery Inc.
Flat screens, Cypress vat (12 rows) ..... Improved Machinery Inc.
Foam breaker, mechanical ..... Improved Machinery Inc.
Hood over brown stock washers and knotters ..... J. O. Ross Engineering Corp.
Jonsson screens, stainless steel plates, ⅜-in. diameter perforations ..... Bird Machine Co.
Lime slaker, No. 4 ..... Dorr-Oliver Inc.
Mixers (3), one chlorine dioxide Hasteloy ..... Improved Machinery Inc.
Motors, electric (182) ..... Westinghouse Electric Corp., General Electric Co.
Pumps (60) ..... Bingham Pump Co., Worthington Corp.
Tile lining for bleach washer towers and seal tanks ..... Stebbins Engineering & Mfg. Co.
Tile linings for high-density storage ..... Chemical Linings Inc.
Valveless filter (1), vacuum type, 9½-ft. diam., with Reliance variable speed drive ..... Improved Machinery Inc.
Variable speed drives for bleach washers, brown stock washers, valveless filter ..... Reliance Electric & Engineering Co.
Ventilating systems, including operating floor roof and make-up systems; screen room roof system; exhaust system for bleach towers and seal boxes ..... J. O. Ross Engineering Corp.
Washers, bleach (5), 8-ft. diameter, 16-ft. face ..... Improved Machinery Inc.

Black liquor recovery

Agitator (1), side-entering for main dissolving tank ..... Mixing Equipment Co. Inc.
Air heater (1), steam coil type ..... American Blower Corp.
Airveyor system (1), 10 tons per hour capacity when unloading and 8 tons per hour when reclaiming ..... Fuller Co.
Black liquor heaters and pumps ..... Combustion Engineering Inc.
Cascade evaporator, two-wheel type, each wheel 14 ft. in diameter and 8 ft. wide ..... Combustion Engineering Inc.

Principal equipment and suppliers at Eastex mill (continued)

Evaporator (1), sextuple effect, 475 gpm capacity ..... Goslin Birmingham Mfg. Co. Inc.
Fans (2), induced draft and forced draft ..... American Blower Corp.
Liquor spray guns (6), oscillating in vertical plane ..... Combustion Engineering Inc.
Main dissolving tank (1), for recovery furnace ..... Combustion Engineering Inc.
Motors, electric (84) ..... Westinghouse Electric Corp., General Electric Co.
Precipitator (1), double chamber, dry bottom, 130,000-cfm capacity ..... Koppers Co. Inc.
Pump (1), special alloy construction, powered by 40-hp motor through American Blower fluid drive ..... Worthington Corp.
Pumps, special alloy centrifugal, for liquor evaporator ..... Worthington Corp.
Pumps (33 total for liquor recovery and power) ..... Worthington Corp., Bingham Pump Co.
Recovery furnace (1), three-drum type, with water-cooled decanting hearth and tangential tube superheater and integral economizer ..... Combustion Engineering Inc.
Salt cake mixing tank (1), for recovery furnace ..... Combustion Engineering Inc.
Steam air heaters (2) ..... Combustion Engineering Inc.

Recausticizing system

Bucket conveyor (1), vertical, hot lime ..... Chain Belt Co.
Causticizers (3), Dorrco, 10 × 11 ft. ..... Dorr-Oliver Inc.
Drag conveyor (1), hot lime ..... Chain Belt Co.
Dregs washer (1), unit compartment, 14 × 15 ft. ..... Dorr-Oliver Inc.
Green liquor clarifier (1), unit compartment, 26 × 24 ft. ..... Dorr-Oliver Inc.
Kiln (1), rotary, 8 × 250 ft. ..... Traylor Engineering & Mfg. Co.
Lime mud agitator (1), 18 × 15 ft. ..... Dorr-Oliver Inc.
Lime mud filter (1), 6 × 6 ft. ..... Dorr-Oliver Inc.
Lime mud washer (1) four compartment, 26 × 20 ft. ..... Dorr-Oliver Inc.
Lime slaker (1), Dorrco No. 8 ..... Dorr-Oliver Inc.
Liquor storage tanks ..... Chicago Bridge & Iron Co.
Motors, electric (52) ..... Westinghouse Electric Corp., General Electric Co.
Pumps (22) ..... Worthington Corp.
Pumps (6), V-Type, four No. 4 and two No. 2 ..... Dorr-Oliver Inc.
Scrubber (1) ..... Peabody Engineering Co.
Vacuum pump (1), L-7 ..... Nash Engineering Co.
White liquor clarifier (1), 4 compartment, 26 × 20 ft. ..... Dorr-Oliver Inc.

Stock preparation

Agitators, for mix tanks ..... Shartle Bros. Machine Div., Black-Clawson Co.
Control valves, for automatic proportioning system ..... Shartle Bros. Machine Div., Black-Clawson Co.
Dump valves ..... Shartle Bros. Machine Div., Black-Clawson Co.
Flow meters, for automatic proportioning system ..... Niagara Electrical Instrument Co.
Jordans (8) Majestic, lava-filled ..... E. D. Jones & Sons Co.
Motors, electric (51) ..... Westinghouse Electric Corp. General Electric Co.
Pumps (12) ..... Bingham Pump Co., Worthington Corp.
Saveall, 9½ × 10 ft. ..... Improved Machinery Inc.
Stock tank (1), 38 × 38 ft. ..... Chemical Linings Inc.

Paper machine room

Breaker stack ..... Beloit Iron Works
Calender stacks (2) twin open side type ..... Beloit Iron Works
Coater (1), Faeber type ..... Beloit Iron Works
Condensate removers, high-speed ..... Beloit Iron Works
Couch roll (1) double-section box ..... Beloit Iron Works
Crane (1) 59-ft. span, trenching ..... Shepard Niles Crane & Hoist Corp.
Distributor, cross-flow ..... Beloit Iron Works
Drainage system (1) 6 flash steam separators, receiver, four condensate return pumps ..... Ross Midwest Fulton Corp.
Dryers (59), four sections, high-pressure design ..... Beloit Iron Works
Fan pump, 20,000 gpm, 45-ft. head, 300 hp. ..... Worthington Corp
Felt expanders ..... Mt. Hope Machinery Co.
Fourdrinier (1), 216 in. wide and 130 ft. long wire, completely removable section ..... Beloit Iron Works
Grewin system (1) ..... J. O. Ross Engineering Corp.
Headbox (1), air pressure or partial vacuum with 5 self-cleaning rectifier rolls ..... Beloit Iron Works
Inter-calender dryers (3), high-pressure ..... Beloit Iron Works
Machine drive, differential, enclosed ..... Beloit Iron Works
Machine hood (1) ..... J. O. Ross Engineering Corp.
Motors, electric (224) ..... Westinghouse Electric Corp., General Electric Co.
Press section (1), section press, inverse press, plain straight hot press, smoothing press ..... Beloit Iron Works
Pulp masters (2), No. 4, 16 ft. long ..... E. D. Jones & Sons Co.
Pumps (33) ..... Bingham Pump Co., Worthington Corp.
Reel, heavy-duty, pneumatic ..... Beloit Iron Works
Roll grinder (1), 294-in. ..... Lobdell United Div., United Engineering & Foundry Co.
Size press (1) ..... Beloit Iron Works
Trim conveying system, injector type ..... J. O. Ross Engineering Corp.
Turbine, steam (1), 1500 hp ..... General Electric Co.
Vacuum pumps (4), two RCV single-stage, and two RCV-2 Compound ..... Roots-Connersville Blower Corp.
Ventilating systems, four wet end summer systems, two bottom felt systems, three heating and ventilating systems, three air make-up units, dry and summer ventilating system, calender coating system ..... J. O. Ross Engineering Corp.
Winder (1), Model L, equipped with single motor type drive, roll ejection and slitter motors ..... Beloit Iron Works

Finishing

Automatic layboy (1) ..... Lamb-Grays Harbor Co. Inc.
Baling press (1), 815-ton ..... Washington Iron Works
Glue buggies ..... Lamb-Grays Harbor Co. Inc.
Header (1) ..... Lamb-Grays Harbor Co. Inc.
Lowerator (1), fully automatic ..... Link-Belt Co.
Pulp cutter (1) ..... Lamb-Grays Harbor Co. Inc.
Rotary cutter and layboy (1), duplex, 120-in. ..... Moore & White Co.
Trimmer (1), 85-in. hydraulic ..... Harris-Seybold Co.
Ventilation system ..... J. O. Ross Engineering Corp.
Wrapper rolls ..... Lamb-Grays Harbor Co. Inc.

Other equipment

Air compressors (2), Model HBB single horizontal and Model YC-2 vertical angle two-stage compressor ..... Worthington Corp.
Bark shredder (1), Gruendler Model 3XE ..... Morris Engineering Co.
Chlorine dioxide generator ..... Olin Mathieson Chemical Corp.
Condensate return pumps (2), C-B for digester units ..... Cochrane Corp.
Dearator, 300-lb. atomizing for water supply system ..... Cochrane Corp.
Demineralizing system, six two-bed units, 200-gpm capacity ..... Cochrane Corp.
Fans (2), forced and induced ..... Clarage Fan Co.
Hog fuel feeder (1) ..... Link-Belt Co.
Instrumentation ..... Taylor Instrument Companies
Bailey Meter Co.
Fischer & Porter Co.
Foxboro Co.
Mason-Neilan Regulator Co.
Motors, electric (38) ..... Westinghouse Electric Corp. General Electric Co.
Power boiler (1), 230,000 lb. steam per hour, 725-psig ..... Babcock & Wilcox Co.
Press (1), Type 020 ..... Jackson & Church Co.
Pumps (19) ..... Bingham Pump Co., Worthington Corp.
Turbo-generator, 7500-kw (under negotiation) ..... General Electric Co.
Steam boiler instruments ..... Bailey Meter Co.

Organic coatings for paper

Part V — Wax, polyethylene-wax, and polyisobutylene-wax coatings

Waxes owe their importance as paper coatings to their high water vapor resistance. Their low softening point and brittleness can be overcome by the addition of polyethylene or polyisobutylene

THE TECHNOLOGY OF COATING paper with organic compounds has a long history, although much less is known about the coating of paper in ancient times than about the protective coatings which were used for wood and metal. It is reasonable to assume, however, that the original paper coatings contained waxes, shellac and bituminous or asphalt-like materials which made the paper water-resistant. In more recent times, prior to the advent of the plastic age, oleoresinous varnishes were applied to paper in order to provide gloss and abrasion resistance. Such coatings, of course, were brittle, and tended to be tacky.

Today a large volume of paper is coated with various waxes to impart moisture and moisture vapor resistance. Inexpensive natural resins are widely used in the form of "spirit varnishes" where a low cost means of imparting gloss is desired. The paper coater, however, is not limited to these older types of coatings. The great number of plastics currently available, provides him with a wide variety of resins which he can use to impart to the paper virtually any desired decorative or protective quality.

The advent of resins

The introduction of nitrocellulose after World War I provided not only a new type of protective coating for automobiles and numerous other items, but also a new type of coating for paper. Subsequently, other cellulose derivatives such as cellulose acetate and ethyl cellulose were introduced and found to fill specific needs in the paper coating field, because of their heat-sealing properties, high gloss, good protective properties, and good aging qualities. At approximately the same time, the vinyl resins in the form of vinyl acetate, vinyl chloride, and vinyl copolymers became products of the chemical industry. These shared many of the good properties of the cellulose derivatives.

Since World War II, a great variety of other coating materials have been introduced, and these will be discussed and described in this and the following series of papers. Most coatings applied to paper are thermplastic, since thermoplastic materials generally have better flexibility than thermosetting resins. An exception to this has been the oleoresinous varnish used in pulp, and heavy Kraft paper to provide a lining for metal caps for glass containers. More recently, other exceptions to this concept have appeared with the advancement of technology to a point where thermosetting materials with good flexibility have been synthesized. Thus styrenated alkyd-resin combinations which are thermosetting are now used quite extensively where high gloss coatings are desired. These, of course, cure both by oxidation and by the application of heat to provide a thermosetting material. More recently, the polyamide resin-epoxy resin combinations have been introduced. These are thermosetting combinations which have the unique property of maintaining a very high degree of flexibility despite their cross-linked structure.

The point must be stressed that a paper coating ordinarily is a combination of various ingredients, the most important of which is the film-forming resin. To be used in a paper coating, the film-forming resin must possess some degree of inherent flexibility. It must also be sufficiently cohesive to form a film. It must have adhesive properties for the substrate to which it is applied.

In addition to the film-forming resin, a non-flexible resin may be included in a paper coating. This can be a hard, brittle resin of the rosin or rosin derivative type, which by itself does not form a continuous film. Such resins are used widely with nitrocellulose and with other cellulose derivatives where they serve as extenders and as means of increasing the solids contents of the lacquer.

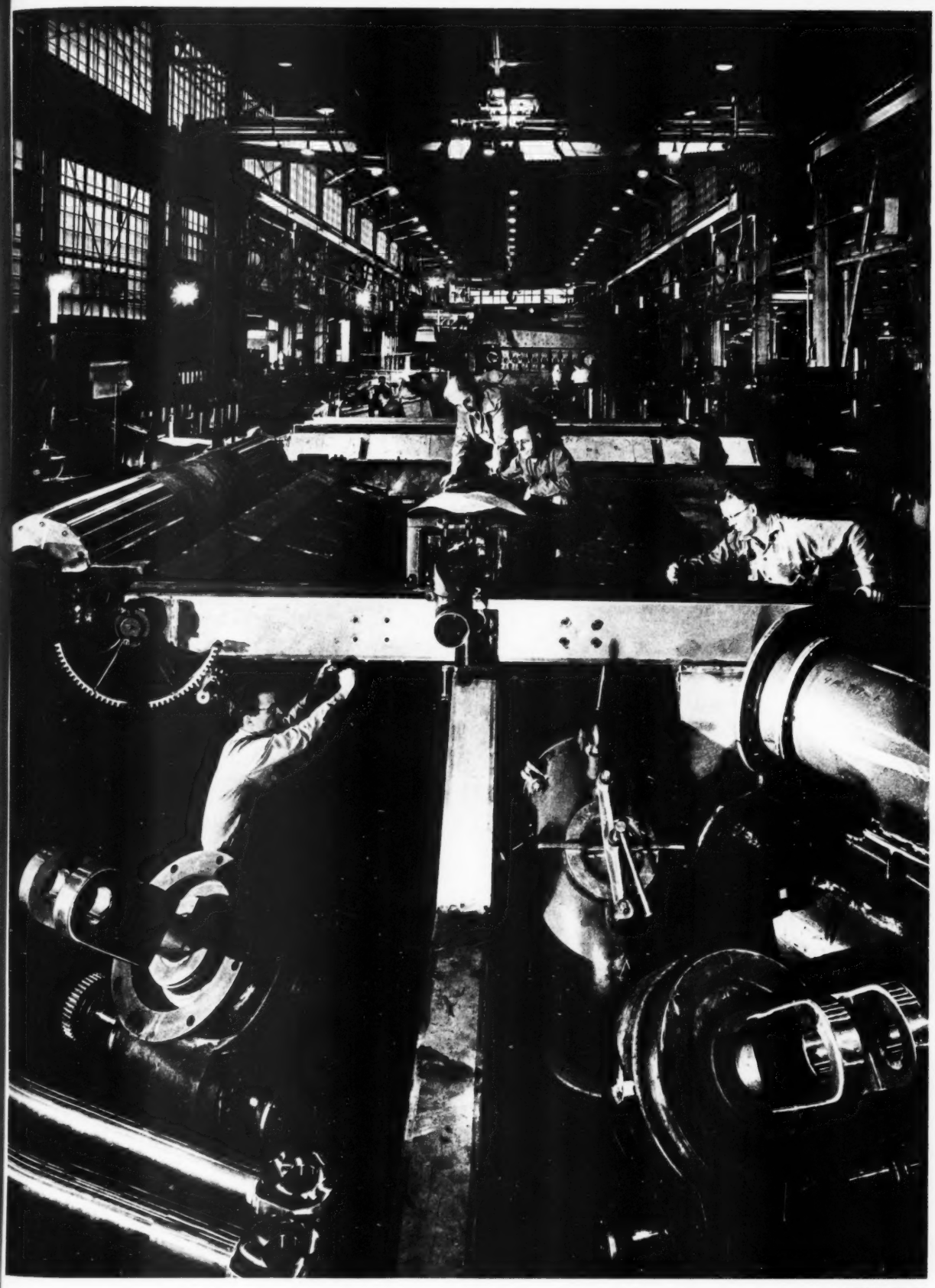
Plasticizers are very important components of most organic coating systems. They not only improve the flexibility of the film but frequently also the ability of the film to flow at the temperatures used for drying. This makes possible a smoother, more continuous, glossier coating.

Numerous modifiers may be added to the paper coating to achieve special characteristics. Thus, waxes and oils may be included where moisture and moisture vapor resistance is needed. Waxes, as well as certain silicone compounds, impart "slip" to organic coatings. Ultraviolet absorbers may be added to improve the life of the coatings which are to be subjected to sunlight. Also, certain optical dyes or optical bleaches may be incorporated to improve the apparent whiteness or the coating. Ordinarily optical bleaches are not effective with nitrocellulose based materials, but work reasonably well with spirit varnishes, polyamide coatings, and styrenated alkyd coatings.

Wax coatings

Wax-coated papers are familiar to everyone in the form of butter cartons, bread wrappers, and milk con-

Chapter 19



TORKEL KORLING

PANORAMA . . . *Main Erecting Floor, Beloit Iron Works.*/ *For further details, please turn the page.*

PANORAMA

The photograph on the preceding page gives some idea of the 500-foot length of the main Erecting Floor at Beloit Iron Works, Beloit, Wisconsin. This extensive area provides the floor space, overhead clearance, and heavy-duty bridge cranes needed to assemble and check completed sections of a paper machine. The Fourdrinier assembly pictured in the foreground is now in production at one of America's leading tissue mills.

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tainers. Wrappers for cheese, frozen foods, cereals, dehydrated foods, meat, crackers, and other bakery products are all coated with wax. Wax-coated paperboard is used widely for drinking cups and for the fabrication of containers for various types of liquid.

Two types of petroleum waxes are used for paper coatings. One of these is paraffin wax and the other is microcrystalline or amorphous wax. Both of these waxes are composed of paraffinic hydrocarbons, but paraffin wax has constituents of lower molecular weight. Paraffin wax is removed from petroleum distillates or overhead stocks by "sweating" or by solvent separation. The microcrystalline waxes, on the other hand, are separated from residual stocks.

Paraffin waxes ordinarily melt in the range of 100-150° F. Microcrystalline waxes, on the other hand, vary in melting point from 140-200° F, and have a slightly higher refractive index.

Waxes owe their importance as paper coatings to their high water vapor resistance. They are also practically free of odor and taste and relatively inert chemically except for their solubility in hydrocarbon solvents. They are readily applied to paper because they change from the solid to the liquid stage over a small temperature range, and they are extremely fluid in the liquid stage. The microcrystalline waxes have better adhesive qualities than the paraffin waxes.

The main disadvantages of the waxes are their relatively low softening point and their relative lack of flexibility, especially at low temperatures. In both of these respects, the microcrystalline waxes are superior to the paraffin waxes. These disadvantages can be overcome by combining the waxes with resins such as polyisobutylene and polyethylene, although such combinations have an important drawback of increased viscosities which in some cases may entail modification of the waxing equipment.

The excellent moisture vapor barrier property of paraffin wax is demonstrated by the fact that commercial waxed papers are available today with water vapor transmission rates as low as .02 grams per 100 square inches when tested for 24 hours at a temperature of 100° F and a relative humidity of 95 per cent on the wet side.

The amount of wax applied depends entirely upon the intended use for the coated paper. Coating weights as low as 1.5 lbs. per 3000 square feet may be used on glassine, whereas paperboard may have as much as 50-60 lbs. of wax per 3000 square feet. Depending on the method of application, the porosity of the paper, and the temperature of the wax melt, the wax will either be absorbed by the paper, or it will remain on the surface of the paper as a film. An impregnated paper is known as a dry waxed structure, whereas a surface waxed paper is known as a wet waxed material. A third possibility is the use of wax as a means of laminating two dissimilar types of cellulosic materials, such as glassine and paperboard. Frequently, also, two sheets of glassine may be laminated with wax to obtain a structure which has both good greaseproofness, good moisture and moisture vapor transmission resistance. In addition to glassine, parchment and cellophane may be used with wax in order to obtain greaseproof structures.

Waxes are also available as anionic water dispersions with solids contents of 40-50 per cent.

The largest use of paraffin wax is as a paper coating, and roughly 60 per cent of all wax produced finds its way into this application. The largest use for microcrystalline wax, on the other hand, is in the lamination of paper, foil, glassine, and related materials where flexibility, adhesion, and high melting point are required.

Polyethylene-wax coatings

Certain resinous materials may be added to paraffin wax in order to upgrade the coatings. Thus, a combination of polyethylene with paraffin or microcrystalline wax will yield a coating with improved clarity, increased blocking temperatures, and stronger heat and adhesive properties.

Ordinarily waxes and polyethylenes are not truly compatible, even with low molecular weight polyethylene. Dispersions, however, can be obtained which are stable at both room and elevated temperatures. The quantity of polyethylene to be added is usually limited by the viscosity which can be tolerated. Thus 10 per cent of a very low molecular weight polyethylene will raise the absolute viscosity of paraffin from about 0.02 poises to 0.08 poises. A mixture of 40 parts of this polyethylene with 60 parts of paraffin will have a viscosity of 1 poise which is roughly 50 times greater than the viscosity of the pure paraffin. All of these viscosity measurements incidentally, are at 130° C.

The tendency to increase the viscosity of the paraffin melt by the addition of polyethylene increases markedly with increasing molecular weight of the polyethylene. The addition of polyethylene also results in an increase of the melting point of the paraffin, thus increasing heat-sealing temperatures. As an example, a paraffin with a ball and ring softening temperature of 53° C will have its softening temperature increased to 90° C by the addition of 15 per cent of a medium molecular weight polyethylene. Polyethylene-wax mixtures have increased tensile strength which is reflected in stronger heat-seal bonds.

Since the presence of polyethylene in wax requires the use of higher temperatures, it is often necessary to incorporate antioxidants into the polyethylene-wax mixtures. The higher temperatures tend to cause some decomposition of the paraffin, resulting in the formation of peroxidized fatty acids. If antioxidants are used, it is essential to use non-toxic antioxidants since most of the applications of wax-polyethylene blends are in the food packaging industry.

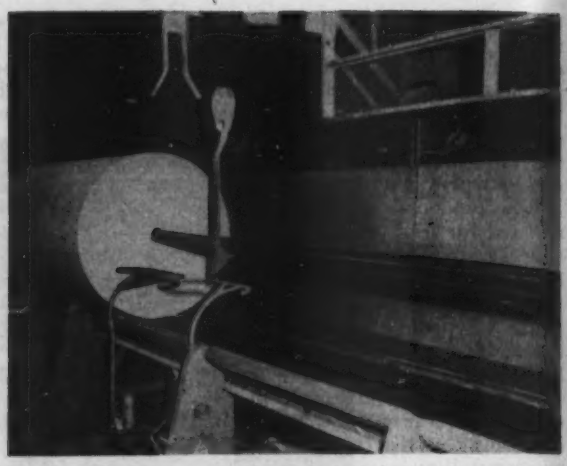
In the preparation of the hot melt coating, the polyethylene is usually dispersed in the wax by high speed agitation at 140-150 C. The minimum coating temperature of the blend is 100° C, and ordinarily higher temperatures are employed if appreciable quantities of polyethylene are present.

Polyisobutylene-wax coatings

Polyisobutylene (Vistanex) is also used as an additive to paraffin and microcrystalline waxes to achieve results similar to those described for polyethylene-wax blends. Polyisobutylenes are said to improve the resistance of waxes to the penetration of moisture vapor. They also improve the flexibility of waxes, so that they are more adaptable for use in frozen food packaging. Polyisobutylene contributes tack to waxes, making them more useful for lamination. Where good blocking resistance is necessary, a relatively high molecular weight polyisobutylene should be used. Like the polyethylenes, the polyisobutylenes contribute to increased viscosity of the wax melts. Thus, 10 per cent of a medium molecular weight polyisobutylene will increase the viscosity of paraffin at 210° F. from 4 centistokes to 2000 centistokes. A very low molecular weight polyisobutylene, on the other hand, would increase the viscosity to only 20 centistokes. The viscosity increase is greater with micro-

(Continued on page 490)

Set of rolls is ejected from the winder across the bridge, which rises automatically



Weight of shaft is taken by the crane hooks as the rolls move away

Automatic roll handling at Powell River

COLIN CAMPBELL*

Automatic shaft handling and near-automatic core feeding are the latest developments in modern roll handling

THE MOST MODERN automatic roll handling installation in the pulp and paper industry has just been completed at Powell River.

Embodying the main features of similar systems recently installed in the United States, the Powell River Co. Ltd. advanced two automation steps further than any other mill by installing the following equipment on its three winders in the No. 7 and 8 machine room:

1. automatic shaft handling.
2. near-automatic core feeding.

Success of Powell River's installation, which has resulted in better quality finishing owing to the modern methods introduced at the same time, was all the more noteworthy in view of the following factors:

(a) the installation had to be made without interrupting newsprint production.

(b) the difficult machine room-finishing room layout. Not only was there a shortage of space at the dry end of the two paper machines, but because the existing finishing room is located two floors below the machine room, rolls must be transferred by a lowerator in their unfinished state. (When Powell River's new ninth paper machine goes into production this winter, its lowerator will follow the finishing process, as in other plants.)

Colin Campbell

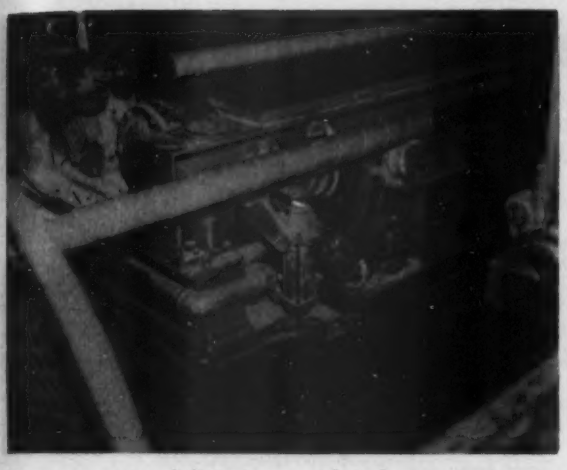
The equipment was supplied by the Lamb-Grays Harbor Co. Inc. of Hoquiam, Wash. Installation was carried out by sub-contractors of Northern Construction Co., J. W. Stewart Ltd., C. H. E. Williams Co. Ltd. (electrical) and Flanders Installations Ltd. (mechanical.)

Acting as coordinator on the $200,000 installation was Colin Campbell of the Powell River engineering staff.

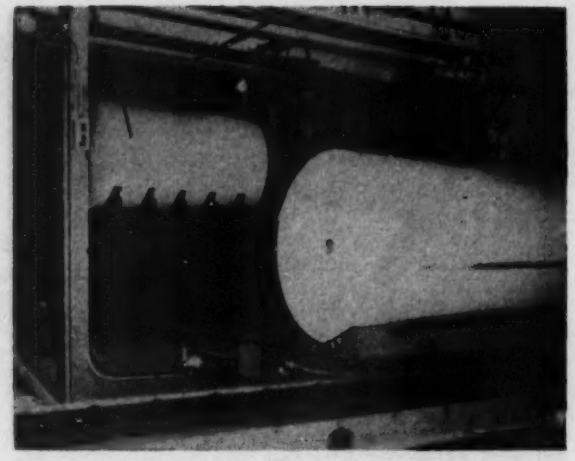
Roll stripping and sorting

Actually, three separate systems were installed in Powell River's No. 7 and 8 machine room, one for each of the three winders. Each system performs the following functions.

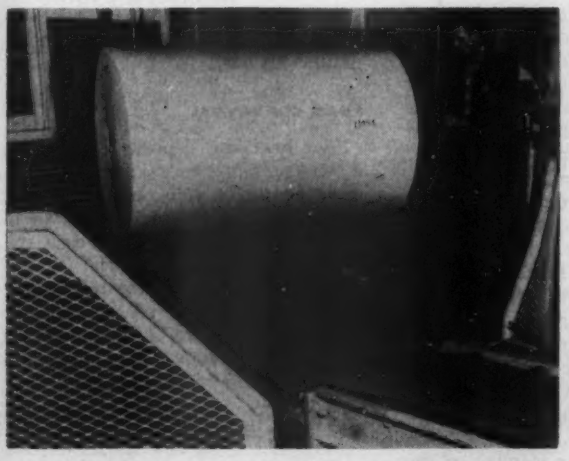
*Powell River engineering staff



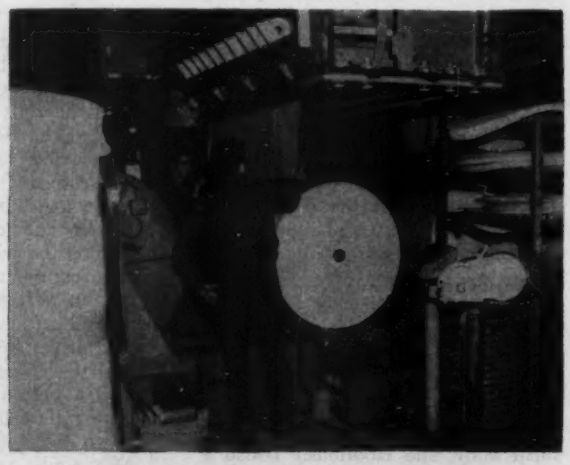
Crane returns core shaft to storage pocket, where cores are power-fed onto shaft



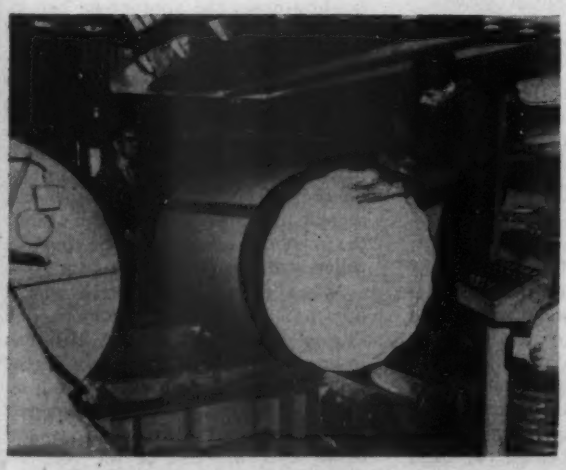
Lowerator delivers rolls to floor below where they are fed onto the finishing room conveyor system



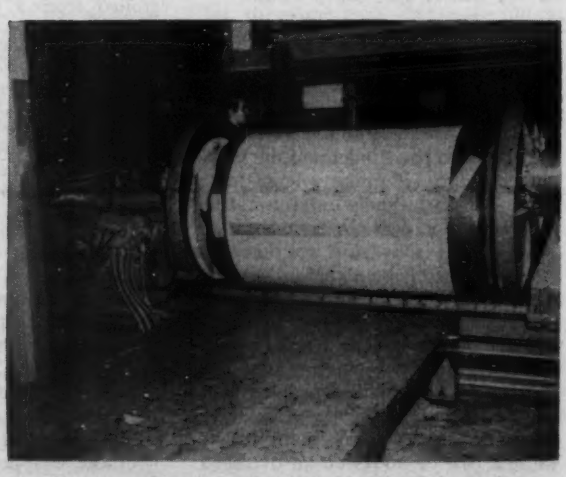
Swing conveyors are used to turn rolls around corners



Desired wrapper width is selected by pushbutton



Dispenser feeds purple bands with glue applied



Glue-sprayed heads are held to header platens by suction

The bills are applied, weight recorded, and roll goes down storage ramp

Hydraulic upender tilts the rolls for lift-truck handling

1. Strips rolls off the winder core shaft.
2. Returns the core shaft ready for use.
3. Stores the rolls while they are dressed and marked.
4. Permits the rolls to be passed on in any sequence.

A comparison of the old methods and the new system will illustrate the advantages of the system.

Old method

Formerly, about once every 20 minutes, the crew had to handle a set of rolls by air hoist from the winder to wrapping drums, manually extract a 400-pound shaft 22 ft long, juggle the shaft back to the winder on a small dolly, and laboriously reload it with cores before putting it back on the machine. After wrapping, the rolls had to be manhandled onto dollies, wheeled across the floor, and pushed off the dollies onto the lowerator.

Automatic system

Now, when the set of rolls is ready for discharge from a winder, one of the crew pushes a button and a bridge lowers, drawbridge fashion, to form a deck between the winder and the stripping conveyor. Flipping a lever starts an air-driven kicker which ejects the rolls across the deck.

When the rolls stop on the conveyor the bridge automatically rises. An anchor arrangement moves up and engages a collar on the core shaft.

The operator pushes a button and the conveyor starts moving the rolls end-wise off the shaft which remains stationary. Just before the rolls leave the shaft, the conveyor stops briefly while a pair of hooks on an overhead crane move down and take up the weight of the shaft. The conveyor then moves the rolls clear of the shaft.

When the rolls are in proper position, the conveyor stops and a kicker pushes the rolls as a group onto the sorting deck. Here they come to rest against a row of stops.

The core shaft from which the rolls were removed is carried by its crane up, over and down into a storage pocket on the winder apron; then the crane returns to "home" position. Cores are started onto the shaft by hand and a foot-controlled mechanical feeder drives them into place. When the shaft is required, the operator pushes a button and a pair of arms rise up rolling the shaft into its bearings on the winder.

Meanwhile, another member of the crew strips and marks the rolls on the sorting deck. This done, he releases them in any desired order by lowering appropriate pneumatic deckstops controlled from a pushbutton station.

The rolls pass onto a long conveyor which transports them to the lowerator feed unit. This lowers the rolls about 9 inches to the height of the lowerator ramp and feeds them to the lowerator mechanism. The flow of rolls is automatically controlled to suit the ability of the lowerator to carry them away.

Roll finishing

In the finishing room the rolls are completely wrapped, weighed, labelled and upended ready for loading onto railway flatcars. To accomplish this, a system of conveyors and ramps and the following special equipment is used: a pair of wrapper drums, an overhead wrapper dispenser, two band dispenser carts, a head gluer, a hydraulic heading machine, a scale with a conveyor mounted on it and a hydraulic upender.

Feed conveyors

The lowerator deposits the rolls on a storage ramp at its lower end. A deckstop passes rolls, one at a time, onto the first conveyor on its way to the finishing line. Enroute, each roll passes over five conveyors. Two of them swing to "turn" the roll around corners. At the end of the conveyor system the rolls are "kicked" down a long storage ramp, where each roll awaits its turn to be wrapped.

Finishing line

Two men, one on each side of the finishing line, control the operations. One man pushes a button to tip a roll through onto the wrapping drums, then starts the drums revolving. By holding down the appropriate button, he then feeds from the dispenser above the size of wrapper suited to the roll. Both men guide the wrapper around the roll and then, letting the rotating roll continue to draw its wrapper, they start the purple bands feeding. This they do by stepping on treadles on the sides of the band dispensers, thereby pressing a rubber wheel against the revolving drums and driving the rollers which dispense the bands.

When enough wraps have wound on the roll a pushbutton-operated "flying" wire cuts the sheet. The men insert soft heads at the ends of the roll, cut off the bands by tramping on a pedal on the sides of the dispenser carts, then crimp the wrapper and bands over the end of the roll. At

(Continued on page 493)

Cold soda pulping of aspen by improved methods*

KENNETH J. BROWN**
and WILLIAM H. MONSSON†

RESULTS of recent experiments at the Laboratory have shown that complete liquor penetration in this process can be obtained by using forced penetration methods during the steeping. The methods used to improve penetration in these previous studies included: (1) evacuation of air from the chips prior to steeping, (2) exerting hydrostatic pressure on the liquor surrounding the chips during the steep, and (3) mechanically compressing and decompressing the chips while they are submerged in the liquor.

Autoclave treatment

Cold soda pulps were made from green aspen in yields of 96.7 to 84.7 per cent by varying the chemical concentration from 15 to 100 gms. per liter and the steeping time at room temperature and 11 atmospheres of hydrostatic pressure from 3 to 120 min.

The liquor was observed to have reached the centers of all but the exceptionally thick chips after 20 min. of steeping at 11 atmospheres of pressure and at solution concentrations of 25 to 75 gms. per liter.

The energy required to fiberize the pressure-treated chips decreased from 190 to 20.9 hp. days per ton of pulp as the time and chemical concentration was increased from 3 to 120 min. and 15 to 100 gms. per liter, respectively. Increasing the caustic soda concentration from 25 to 75 gms. per liter had considerable effect on softening the chips. For example, the same amounts of energies were used in fiberizing chips from a 60-min. treatment with a 25 gms. per liter solution and from a 10-min. treatment with a 75 gms. per liter solution.

Steeping the chips at atmospheric pressure in a 50 gms. per liter solution for 2 hrs. at 25°C. consumed 7.5 per cent caustic soda and gave a pulp yield of 90 per cent. The chip sinkage obtained after the 2-hr. atmospheric soaking was only 32 per cent and visual examination showed that the liquor had not reached the centers of most of the chips.

Digester treatment

The results of cold soda hydrostatic pressure treatments made on a larger scale were about the same as those obtained from the preliminary treatments. The pulp yield obtained, however, from the 2-hr. atmospheric steep made in the digester was 3 per cent below that obtained from the same treatment in the autoclave. The yield of 87 per cent in this case was about the same as that obtained from a 1-hr. treatment at 11 atmospheres of pressure and the same liquor concentration.

Economical amounts of energy were used in fiberizing chips from these treatments. Three of these pulps were fiberized to a freeness of 450 ml. (Canadian Standard) for use in corrugating boards by using 22.1 to 23.3 hp. days per ton. Another pulp, produced at a freeness of 375 ml. for use in making magazine-book papers, consumed 26.9 hp. days per ton.

Continuous treatment

Continuous cold soda pulping treatments were made by feeding aspen chips and caustic soda liquor simultaneously into a roll-type refining mill. The chips were repeatedly compressed between a revolving cylinder and a rotating roll as they travelled through the machine. A pressure of 100 pds. per lineal inch was maintained on the roll as the cylinder turned at the rate of 155 rpm. The treatments were made at room temperature with solutions of 40 and 50 gms. per liter concentration. The chips were retained inside the mill in the presence of the caustic soda liquor for about 1 min. before being discharged in the form of a partially fiberized pulp. The discharged material was then completely fiberized by passing it through, in one case, an 8 in. disk mill. In the other continuous pulping trials, a 36-in. disk mill was used to refine the pulps for use in making corrugating boards.

Aspen chips treated continuously, were "broken down" and well penetrated after a retention period in the machine for about 1 min. The effectiveness of the partial fiberizing action given the chips in this treatment, was reflected by the low energy requirement values of about 14 hp. days per ton used in fiberizing the material in the disk mill.

Pulp properties

All of the pulps developed strength and decreased in freeness with increased processing in a test beater. Pulps made by the hydrostatic-pressure method from green chips, increased in strength as the time of steeping was increased from 10 to 60 min. and as the concentration of caustic soda was increased from 25 to 50 gms per liter. Increasing the concentration from 50 to 75 gms per liter for a 1-hr. treatment slightly weakened the pulp. On the other hand, pulp made in 20 min. with a 75-gram-per-liter solution, was much stronger than a 1-hr., 25-gram-per-liter pulp and almost as strong as the best pulps made in this study.

Atmospheric steeping of the chips for 2 hrs., produced pulp of the same strength as pulp from a 1-hr. pressure-impregnation using the same solution concentration of 50 gms. per liter. This result was not expected in view of the non-uniform penetration obtained in the atmospheric pressure steeping.

Strength properties of a pulp made from a pressure impregnation at 45°C. for 15 min., were only slightly higher than those that would be expected of a pulp made at 25°C. for the same time and were not as high as those of pulp made in 1 hr. at 25°C. Also the strength properties of a pulp made by steeping the chips for 100 min. at atmospheric pressure after a 20-min. pressure impregnation, did not compare with those of a 60-min. pressure-treatment pulp.

The opacity of the cold soda pulps decreased in a range of about 78 to 74 per cent as the chemical concentration was increased from 25 to 75 gms. per liter. Lowering the freeness of the pulp from 450 to 250 ml., it increased the opacity about 1 per cent in the case of the pulps having yields above 90 per cent and decreased the opacity about 1 to 2 per cent in the case of the lower yield pulps. Pulp made by atmospheric

(Continued on page 493)

*An abridgement

**Chemical Engineer, Forest Products Laboratory, Forest Service U. S. Dept. of Agriculture
†Hooker Electrochemical Co., Niagara Falls, N. Y.

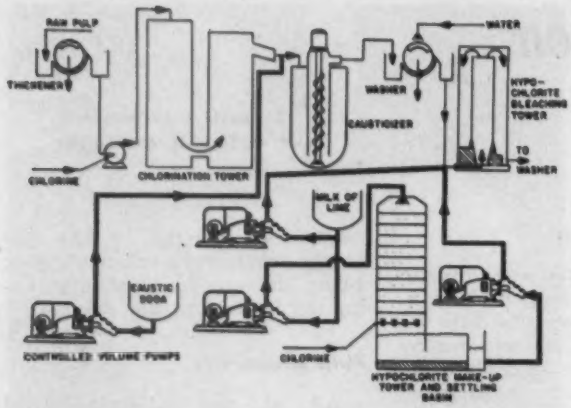


Fig. 1—Three stage bleaching process using chlorination, caustic extraction and hypochlorination stages

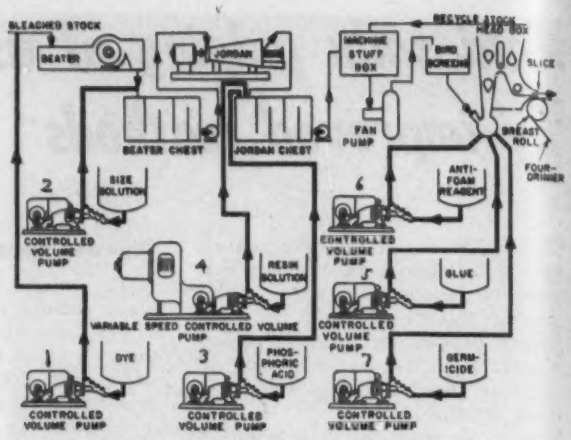


Fig. 2—Stock preparation system

Metering chemicals in papermaking

A. M. KOHN*

PAPER MANUFACTURERS recognize that accurate control of process variables, such as flow, temperature, pressure and pH, ensures efficient production of uniform, high quality paper. Conventional instruments are available to control most of these variables. Control of low capacity flows of papermakers' chemicals in many instances, however, cannot be solved successfully by conventional flow control techniques. Recognizing this, paper mill operators have been quick to adopt a new flow control approach, namely, the use of controlled volume pumps as flow controllers, ratio controllers and final control elements.

Pulp bleaching

In the four major paper pulp bleaching processes employed (direct chlorination, hypochlorination, peroxide and chlorine dioxide bleaching) precise control of small quantities of chemical reagents is requisite to economical operations.

Chlorination, direct reaction of chlorine (as vapor) with unbleached pulp, is primarily used to destroy residual lignins after cooking.

After chlorination the highly acid pulp is neutralized and cleaned in the caustic extraction step (Fig. 1). Here a controlled volume pump varies the rate of caustic addition through a continuous dilution system. This system makes it possible to control pulp consistency and also control treatment level. The controlled volume pump capacity is adjusted in proportion to pulp rate, to deliver a controlled quantity of concentrated caustic into the water line. A consistency regulator controls the water (dilute caustic) flow rate. This system provides close control of process conditions and results in a more uniform product.

Hypochlorination

Hypochlorination, the reaction of hypochlorites with pulp to destroy color bodies and dyes, is an important bleaching technique. It is sometimes used alone but more often in conjunction with other processes to achieve specific results. In Fig. 1 straight chlorination and caustic extraction precede the hypochlorination step.

Controlled volume pumps perform two functions in these systems, namely, controlled preparation of bleach liquor, and controlled addition of bleach liquor and pH control agent to the process.

The first controlled volume pump continuously meters milk of lime to the top of the hypochlorite preparation tower. This addition is carefully controlled according to the pulp flow rate so that only a nominal operating reserve of bleach liquor is prepared. Under-production, of course, will result in production stopage while over-production is wasteful (due to eventual decomposition of the hypochlorite) and necessitates large corrosion-resistant storage facilities. The second controlled volume pump ac-

*Milton Roy Co.

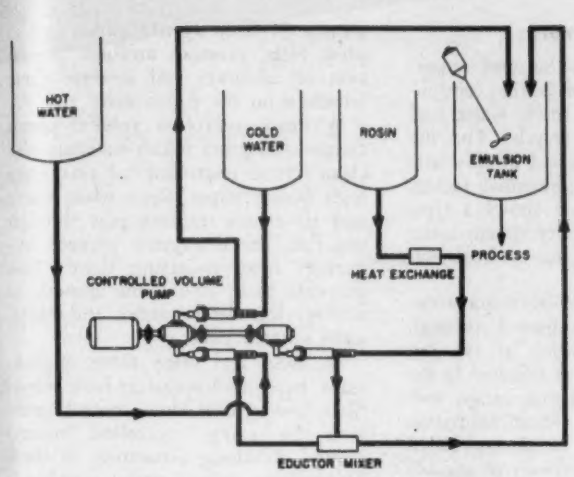


Fig. 3—Continuous rosin emulsification system

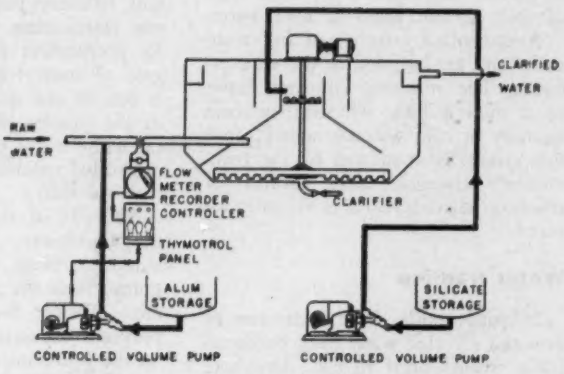


Fig. 4—Raw water clarification system

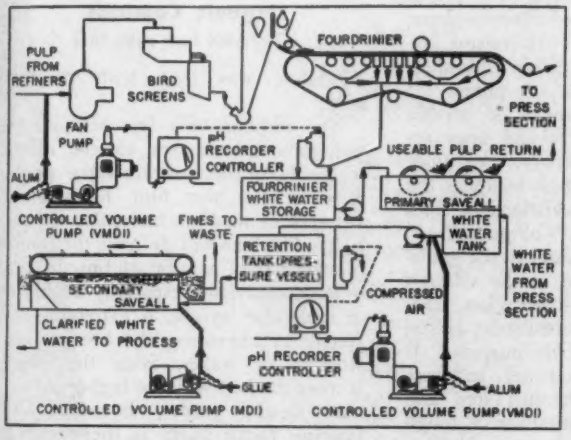


Fig. 5—White water recovery system

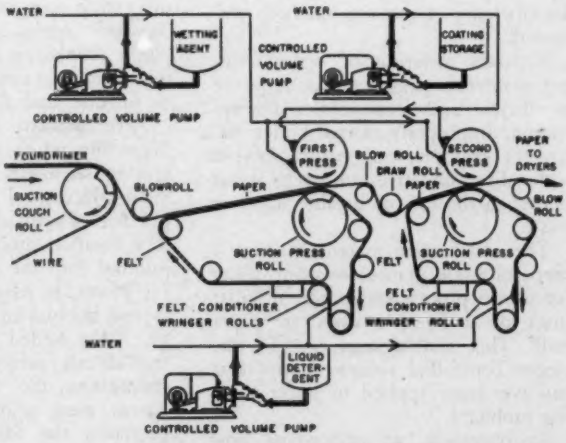


Fig. 6—Machine coating process

curately controls the rate of addition of hypochlorite solution to the bleaching tower. This positive control measure insures uniform operation of the system and eases quality control problems.

Stock preparation

Controlled volume pumps used in stock preparation systems assure efficient treatment. Chemical consumption is reduced and equipment savings are affected, since expensive storage tanks can be eliminated, and improved product quality results. As illustrated in Fig. 2, controlled volume pumps add dye (1) and size (2) in proportion to the stock flow rate providing rapid, intimate blending.

Additional pumps which are often used, not shown in this illustration, include an alum pump for pH adjustment and a controlled volume pump for metering mordants. Phosphoric acid is sometimes added in measured quanties, as illustrated (3), for brightness control.

A fourth controlled volume pump (4) is illustrated controlling the addition of wet strength resin to the pulp. Accurate control of expensive resins assures maximum chemical efficiency and results in high product quality.

Three additional controlled volume pumps in this system accurately meter processing additives. The addition of animal glue (5) to the headbox improves flocculation of stock on the machine. This increases furnish retention and forms a smooth dense sheet, permitting high machine speeds. Controlled volume pumps assure accurate control of glue addition over the wide viscosity ranges inherent with ambient temperature conditions.

Liquid defoamer (6) metered directly to the headbox reduces or eliminates foaming on the paper machine. Finally, continuous addition of up to 6 gph of germicide (7) to the stock (between the stuff box and paper machine) insures a residual germicide concentration high enough to prevent slime formation and attendant problems.

Continuous rosin emulsification

Paper mills add as much as 250 gal. of size emulsion per ton of paper. Continuous size preparation systems eliminate the storage and batch preparation problems often encountered with these large flows.

A three-cylinder formulating controlled volume pump used in rosin size emulsification (Fig. 3) automatically blends hot water, rosin size and cold water, to produce the wide variety of emulsions required. The three pumping cylinders are driven from a single drive to permit overall capacity variations, through speed control. Capacity of each pumping cylin-

der is independently variable by means of manual stroke length adjustment, to permit variations in the basic ratio of rosin to hot water to cold water.

A controlled quantity of hot rosin and water are blended in the eductor-mixer. The resulting emulsion flows to a mixing tank where a metered quantity of cold water is added. Since this system is unaffected by the rosin viscosity changes, close control of emulsion characteristics is virtually assured.

Water treating

In paper mills, huge quantities of raw and recycled water must be chemically treated prior to use. Anywhere from 600 to 180,000 gal. of raw water may be required to process one ton of paper, depending upon the type of product processed and upon the efficiency of recovery methods employed.

Accurate metering of water treating chemicals employed is requisite to efficient and economical plant operation. Improperly treated boiler water, for example, can greatly shorten boiler life; undertreated white water can mean the loss of useable fibers to waste.

The clarification system in Fig. 4 prepares 8,000 gpm of make-up water for use in process and power installations of a large midwestern paper mill. This system uses one of the largest controlled volume pumps that has ever been applied to water treating problems.

In operation, an orifice-type flow meter controller is mounted in the raw water inlet line. The linear electric control signal (proportional to raw water flow rate) from this meter is transmitted to a Thymotrol panel. The panel automatically varies the speed of the controlled volume alum pump in direct response to the flow meter controller signal. Ratio of alum to raw water is thereby maintained constant despite any fluctuations in raw water flow.

In contrast, the sodium silicate concentration in this system is accurately maintained with a constant speed controlled volume pump which handles a maximum of only 7.3 gph. Since the silicate reacts more slowly than alum, overall proportionality is sufficient to maintain the treatment level within economic limits. The capacities of both the alum and silicate controlled volume pumps are variable from 0 to 100 per cent of maximum through stroke length adjustment. This makes it possible to quickly vary the treatment level (chemical to water ratio) as raw water conditions demand.

White water recovery

In the paper mills the most important recovery process is the continuous clarification of white water and its preparation for recycle. The degree of control exercised at this step is one of the most influential factors in the process. Fig. 5 shows a typical white water recovery system using controlled volume pumps as final control elements.

The pH of the white water from the fourdrinier is adjusted through automatic alum addition at the fan pump. Since the pH is adjusted to the most efficient flocculation range, two purposes are served. Sheet formation on the fourdrinier is closely controlled and the maximum recovery of useable fibers at the saveall is promoted without including unuseable fines which would weaken the final sheet. In mills processing only one type of paper, a constant speed controlled volume pump (replacing the pH control system in Fig. 6) continuously adds alum or sulfuric acid at the fan pump.

After primary recovery of useable fibers the white water and fines are sent to secondary recovery. An automatic pH control system readjusts the pH for efficient flocculations of fines in a flotation process. Compressed air, injected into the stream at the transfer pump, is released to the solution as fine bubbles in the secondary saveall. Glue added immediately before the saveall serves two purposes. It counteracts the effect of antifoam agents used prior to this step and promotes the formation of a tough adhering floc. The floc or froth is skimmed off the top of the saveall by an endless brush and the clarified white water is returned to process.

Coating processes

Controlled volume pumps accurately deliver the small quantities of chemical additives required to make the final modification in paper surface characteristics in machine and conversion process coating. Usually less reagent (dye, size or filler) is required in these processes than in stock preparation, since the chemicals are concentrated only in the surface of the sheet.

Machine processes

In these applications (Fig. 6) a standard motor-driven pump fixes the quantity (maximum 60 gph) of concentrated reagent fed directly into a water line which then delivers dilute reagent to the processes.

In addition to reagents which improve paper characteristics, others are used to improve processing techniques. Wetting agents, added at the press rolls, promote uniform dispersion of additives and increase their retention on the paper sheet.

A third controlled volume pump meters detergents which maintain the clean felt so important for producing high quality paper. Since white water and all excess reagents pass through the felt, the detergents prevent impurities from collecting there. This prevents mold and slime growth as well as felt deterioration, and eliminates spotted paper.

In these and many other applications, paper mill operators have solved their low-capacity flow control problems by using controlled volume pumps. Resulting economies in these plants have helped make possible a high quality product at reduced cost.

Organic Coatings

(Continued from page 483)

crystalline wax than with paraffin wax.

The addition of a few per cent of polyisobutylene serves to cut down markedly on the moisture vapor transmission of a wax film. Roughly, 5 per cent of medium molecular weight polyisobutylene will decrease the transmission rate of paraffin 20 times.

Polyisobutylene, especially of higher molecular weight, is extremely effective in improving the heat-sealing strength of waxes. Since the effect is more marked with the higher molecular weight grades, however, the limiting factor again is the viscosity of the blend produced.

Other wax modifiers

Waxes are also modified with rosin and rosin derivatives. The rosin compounds serve to increase gloss and hardness and also help to improve bond strength and adhesion. In addition to rosin itself, polymerized rosin, and hydrogenated rosin are used. The methyl ester of rosin and hydrogenated rosin have been recommended as have the glycol and diethylene glycol esters of rosin. Ester gums, the glycerol esters of rosin, as well as the glycerol esters of the hydrogenated and polymerized rosins are used in combination with paraffin waxes. The pentaerythritol ester of rosin and the maleic modified rosin ester of pentaerythritol are also wax additives as are the glycol and diethylene glycol esters of hydrogenated and polymerized resins.

Butyl rubber and low molecular weight polybutylenes are also used as modifiers for paraffin and microcrystalline waxes, usually in concentrations of 2-10 per cent.

UNITED STATES GYPSUM COMPANY

300 WEST ADAMS STREET CHICAGO 6, ILLINOIS

May 29, 1956

Mr. C. R. Crawford, President
Black - Clawson Company
Hamilton, Ohio

Dear Mr. Crawford:

We wish to extend to both you and your Company our appreciation for your splendid performance in furnishing the machinery and equipment for our new Paper Mill at Galena Park, Texas.

The quality of your design and workmanship made possible a start up with minimum difficulties and the production of a quality sheet at full capacity. The delivery of this equipment ahead of schedule made early operation of our Mill possible.

Also worthy of special commendation was the spirit of cooperation in all your people, not only those responsible for the production of the machinery, but also the men in the field who contributed so substantially to the successful start up of the Mill.

With kindest personal regards.

Yours very truly,

UNITED STATES GYPSUM COMPANY

H. C. Bear
Vice-President - Purchasing

HCB/pf

We, of The Black-Clawson Company, deeply appreciate Mr. Bear's kind letter. It is our constant aim to perform in a like manner for all of our customers regardless of whether they buy a single piece of equipment or the machinery for an entire paper mill as did United States Gypsum.

The Black-Clawson Company

BARRELL-LAWRENCE

IN SO intricate and technical a process as the making of paper, the Dryer Felt plays a most vital part. The Lawrence Duck Company of Lawrence, Mass., a subsidiary of William L. Barrell Co., Inc, has been recognized for many years as a leading producer of such felts and has been recently awarded recognition at "Textiles, U.S.A." show, Museum of Modern Art, New York. N. Y.

At Lawrence, the making of Dryer Felts is an art that has been handed down by highly trained craftsmen from generation to generation. Not only do Lawrence specialists assure maintained quality control, but they are always available for cooperation in the solving of paper drying problems. And, regardless of seasons or conditions, Barrell-Lawrence research and development continue at full time.

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112 West 34th Street, New York, N. Y.

Automatic Roll Handling

(Continued from page 486)

present the tail of the wrapper is stuck down with gummed tape, but shortly a tail-gluing attachment will be added which will eliminate this.

The roll is now ready for the "heads" which are glued on each end. The operator puts the head gluer through its automatic cycle twice, providing two heads on which glue has been sprayed. He passes one to the man on the other side. The heads are then positioned on the platens of the heading machine where they are held by suction.

Now the second man, by pushing buttons, kicks the roll off the wrapper drums and across the band carts onto the heading machine. He moves one platen to suit roll length and then starts the "press" cycle. Under hydraulic pressure the two heated platens squeeze the glued heads onto the ends on the roll. The pressure holds for a timed period, allowing the glue to cure and securely bond the heads to the crimped-over wrapper. At the end of the time interval the platens release the roll, which is ejected onto a storage ramp. Once the "press" cycle is started the crew begins wrapping the next roll and has it ready for the heading machine shortly after the previous one is released.

Weighing the rolls

The scale operator selects, by push-button, the rolls that are passed from the header discharge storage ramp. The rolls progress along a conveyor, over a ramp and along another conveyor line to the scale. Each roll stops on the scale, ready conveyor until the scaleman pushes a button to move it onto the scale. He then applies the bills, records the roll weight, stamps the weight on the bills and easily "knees" the roll off the scale conveyor down a storage ramp.

Upender

The lift truck driver controls the operation from here. As he backs away with rolls he has just picked up, he yanks one cord of a pair comprising a drop-cord selector. The hydraulic upender leans back to the down position and stays there while a pneumatic deckstop passes one or two rolls, depending on the selection. As soon as the last roll is on, the upender starts up, pauses for an instant to let the rolls settle to the low end and then continues to the upright position. When the lift truck driver returns he finds his selected load waiting for him.

Cold Soda Pulping

(Continued from page 487)

steeping had an opacity about 2 per cent lower than a pulp made at the same concentration by the hydrostatic-pressure method.

Summary

The use of forced-liquor penetration methods in the cold soda pulping of aspen (Populus tremuloides) showed the following major results:

1. Preliminary batch treatments, varying in duration of 3 to 120 minutes and using caustic soda solutions varying in concentration of from 15 to 100 gms. per liter, produced pulps in yields of 96.7 to 84.7 per cent. Treatments that produced the strongest pulps were a 1-hr. hydrostatic pressure impregnation period with a solution of 50 gms. per liter in strength and a 2-hr. atmospheric steep period at the same liquor concentration level.

2. Cold soda pulp produced continuously by repeatedly compressing and decompressing chips soaked with caustic soda liquor for about 1 min. was only slightly weaker than the strongest pulps made in a batch process.

3. A difference in moisture content of the chips over the range of 15 to 47 per cent had little or no effect on the pulping characteristics or pulp quality.

4. The total amount of caustic soda used to produce cold soda pulps in a small pilot-plant operation varied from 9.3 to 13.7 per cent (moisture-free wood basis) as the liquor concentration was increased from 25 to 50 gms. per liter.

5. Aspen cold soda pulps made by continuous and batch methods were converted into 9-point corrugating boards. The strength properties and flat crush resistance were higher than those of four boards made from commercial aspen neutral sulfite semichemical pulps.

6. Magazine-book-coating-base paper made from 100 per cent bleached aspen cold soda pulp had adequate bursting and tensile strength but was low in tearing resistance and opacity. Coated and uncoated magazine-book papers having satisfactory strength properties were made by adding 20 per cent of commercial bleached pine sulfate pulp to a furnish containing 60 per cent of the cold soda pulp and 40 per cent of commercial bleached groundwood pulp.

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CURRENT COMMENTS

Congressional spending . . . bugaboo of over-expansion . . . and dullness

Did the 84th Congress just concluded go hay-wire in establishing a new record for spending public money? Has prosperity in the paper industry led to undue prospective expansion? No answer to these questions is proffered here, merely a statement that the press has raised them for the public to consider.

Newspaper comment may be disregarded, but when an executive of such outstanding caliber as J. D. Zellerbach, president of Crown Zellerbach Corp., voices a fear of over-expansion, the issue is given industry recognition. In a statement at Vancouver, B. C., Zellerbach is quoted as saying that the newsprint and pulp industries will be in a state of overproduction within two years. He hinted the possibility of a price war and suggested as a palliative a reduction of expansion and if necessary a curtailment of production. He blamed the present expansion to promoters with too little experience in the paper industry.

A New York financial journal takes up the question by indicating that "indigestion pains" may be coming. There is, however, an admitted increasing consumption, and the groups planning expanded capacity rely on optimistic estimates of the per capita use of paper in the years ahead.

The profit question

The profit picture in the paper industry is based on the fact that the huge overhead capacity in dollar investment requires a high percentage of operation to meet the break-even point. With the dollar value of production of paper paralleling the dollar investment annually, this is a serious problem. In other industries production of two to three times invested capital is sufficient to result in profitable operation. In the paper industry it is usually estimated that a mill must produce to 75 or 80 per cent of capacity to reach a break-even point. The pending survey of projected expansion by trade associations and the government may provide a barometer to guage future profit possibilities, for much of the reported new capacity is not as yet finalized by actual contracts for construction.

Future commitments incalculable

A nationally known columnist, widely syndicated, is out with the statement that the Congress just concluded has been the most extravagant of all time. David Lawrence is responsible for stating that this was a give-away Congress unprecedented in history. More than sixty billions of dollars were appropriated for the current fiscal year, but future commitments are almost incalculable. This was possible through the largest tax returns in history and the achievement of a better-than-balanced budget for the year just closed. Non-defense spending is estimated by this writer as five billion dollars a year greater than at the time of the Korean war. Farm legislation involves, including the soil bank, about six billion dollars annually.

The question of increased taxes is certain to attract more general attention in the future as new means of securing revenues are found by federal, state and local governments. Sales taxes are becoming more widely applicable — even to the levy of taxes on corporations doing business within states or communities. In the federal area, the new road-building program is to be financed by increased taxes on the users of fuel and automotive accessories. This will hit every pocketbook owned by a motor car owner, not only the trucks and major users of the new highway network. All of this legislation is conceived, and possibly justified, on the basis of a need for a better economic atmosphere for all segments of the population.

Much of the legislation considered by Congress was of major interest to the paper industry, some opposed and some approved by industry spokesmen.

Successes and failures

The expansion of Social Security benefits involves increased payments by employers as well as their employees. Other bills passed included one for the so-called simplification of Customs procedure, opposed by elements of the paper industry which fear that the substitution of export prices for the present home market price as a basis for collection of duties would mean an actual reduction of the already limited protection afforded by tariff laws.

Among the measures which failed of passage, either by defeat or by default, were the following of interest to the paper industry: A bill to eliminate the "good faith defense" in the Robinson-Patman Act; bills to modify pure food legislation by provisions for limitation of additives etc., and the bill to restrict corporation mergers by requiring pre-notification of government agencies of proposals for industrial consolidations.

All of the above problems are controversial to the extreme and are listed here merely as a history of what happened.

Proposals which died in the past Congress will doubtless be revived in the next Congress, such as a renewed attempt to reduce excise taxes and increase postal rates.

Foreign competition: a brake

A group of Canadian paperboard producers is in trouble with Dominion officials. Sixteen manufacturers accused many years ago of violating the Combines Act, the Canadian equivalent of the United States anti-trust legislation, are again accused of fixing prices and restricting competition. The government commission urges that the violaters of the law be denied the protection of import tariffs as a shield for their operations. Other means failing, the commission asks that tariff rates on these products be reduced to provide foreign competition as a brake on the operations of the Canadian mills.

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*Current Comments are contributed, and the opinions expressed do not necessarily reflect the views of the publisher.

Current Comments . . .

Financial Reports

The financial flurry following Egypt's seizure of the Suez Canal failed to materially affect paper mill securities, although the summer dullness in Wall Street has seen a slowing down in the rise of this industrial group.

Net Incomes

Brown Co.—Net income for 28 weeks ended June 16 was $1,107,133 as compared with $709,540 for the comparable period in 1955.

Champion Paper & Fibre Co.—Net income for the three months ended March 31 was $13,193,384, as compared with $10,201,717 for the like period a year ago.

Container Corp. of America.—Net income for six months ended June 30 was $9,732,000 as against $8,039,000 a year ago.

Crown Zellerbach Corp.—Net income for the first half of 1956 was $24,973,000 as compared with $20,642,000 a year ago.

Dixie Cup Co.—Net income for six months ended June 30 was $2,355,470 as compared with $1,972,77 a year ago.

Eastern Corp.—Net income for the first half of 1956 was $824,465 as against $573,310 a year ago.

Fraser Companies Ltd.—Net six months income was $3,388,077 as compared with $2,383,894 a year ago.

Great Northern Paper Co.—Net income for the half year was $2,857,134 as compared with $2,192,242 a year ago.

Hammermill Paper Co.—Net six months income was $1,798,523 as compared with $1,301,364 a year ago.

Kimberly-Clark Corp.—Net income for the year ended April 30 was $21,601,767, as compared with $20,024,455 for the preceding fiscal year.

Marathon Corp.—Net income for three months ended Jan. 31 was $1,908,795 as compared with $1,812,172 for the same period a year ago.

Masonite Corp.—Net income for the three months ended May 31 was $1,904,518, as against $1,518,487 for the corresponding period a year ago.

Mead Corp.—Net income for six months ended June 10 was $5,689,296 as against $4,374,964 for the comparable period in 1955.

Minnesota & Ontario Paper Co.—Net income for the first half of the year was $4,140,695 as compared with $2,862,024 a year ago.

P. H. Glatfelter Co.—Net income for six months ended June 30 was $1,203,742 as compared with $1,139,734 a year ago.

Rayonier Inc.—Net income for the first half of the year was $8,005,434 as against $8,045,515 a year ago.

Riegel Paper Corp.—Net income for six months ended June 30 was $1,799,279 as compared with $882,843 in 1955 first half year.

Robert Gair Co. Inc.—Net first six months of 1956 income was $5,364,715 as compared with $4,403,328 a year ago.

Scott Paper Co.—Net income for the first half year was $11,414,753 as against $11,074,714 in 1955.

S. D. Warren Co.—Net income for six months ended June 30 was $2,613,000 as compared with $1,328,000 in 1955.

St. Regis Paper Co.—Net income for six months ended June 30 was $12,303,488 as compared with $8,713,047 a year ago.

Union Bag & Paper Corp.—Net 1955 income was $14,266,000 as compared with $10,794,323 in 1954.

West Virginia Pulp & Paper Co.—Net income for three months ended Jan. 31 was $4,446,000 as against $2,955,000 for the comparable period a year ago.

Paper mill corporate changes

Champion Paper & Fiber Co. is arranging an issue of $20,000,000 in debentures to be offered to the public by a group of underwriters. Of this amount, $3,500,000 will be used to prepay outstanding notes, while the balance will go to the firm's general fund.

Hollingsworth & Vose Co. of Boston is offering to purchase from the Blandy interests American Wood Board Co. of Schuylerville, N. Y., and Blandy Paper Co. of Greenwich. The mills will continue to be operated by the present management but as subsidiaries of the Boston firm.

Thor Corp., which already owns Allied Paper Mills of Kalamazoo, Mich., has leased the former Bryant Paper Co., also of Kalamazoo, from St. Regis Paper Co. Included in the lease was a purchase option.

Whale Safety Paper Co. of Waupaca, Wis., may be acquired by Bergstrom Paper Co. of Neenah pending stockholder approval of the action.

Stock and Bond Quotations

New York Stock Exchange — Stocks

Closing Prices	August 7, 1956	July 10, 1956
A.P.W.	4¾	4¾
Celotex	41⅞	44⅞
Same Pref.	19⅛	19¾
Certain-Teed Products	35½	32
Champion P & F (New)	43½	87¾
Same Pref.	°102¼-104½	104½
Chesapeake Corp.	40½	42
Container Corp.	91¼	91⅝
Same Pref.	°100½-102	°101-103
Crown Zellerbach	64¾	64½
Same Pref.	°102½-103	°102¾-103½
Dixie Cup	55¾	53⅞
Eastern Corp.	34½	32⅜
Federal Paper Board	34½	32⅞
Fibre Paperboard	37	39
Same Pref.	°114-124	°120-128
Robert Gair	38⅜	35⅝
Same Pref.	122	117
Great Northern	103	102¼
Hammermill	37¼	35⅝
International	138½	141½
Same Pref.	°99¼-100	100½-101
Kimberly-Clark	55¾	52⅞
McAndrews & Forbes	°42¼-43¾	°43-44
Marathon	41¾	40¼
Masonite	46¾	43¾
Mead Corp.	40	37
Same Pref.	101	°101¼-102½
Same Second Pref.	88-91	81
Minnesota & Ontario	38½	37⅜
National Container	34⅜	35⅞
Same Pref.	61	63
Oxford Paper	49⅛	45¾
Same Pref.	°100½-101½	101½
Rayonier Inc.	41½	38½
Riegel	38¾	36⅝
Scott Paper	73¼	73⅜
Same $3.40 Pref.	°94-96	°94-95½
Same $4.00 Pref.	°99½-101½	°100-101½
St. Regis Paper	58¼	54½
Same Pref.	99¾	°100½-102½
Sutherland	°46½-48	46⅝
Union Bag & Paper	42	39½
United Board & C.	°24⅜-25	23½
United Wallpaper	—	1¾
Same Pref.	24¼	23½
U. S. Gypsum	75¾	68
Same Pref.	°160-172	°176½-178
West Va. P. & P.	60	59½
Same Pref.	105⅛	107

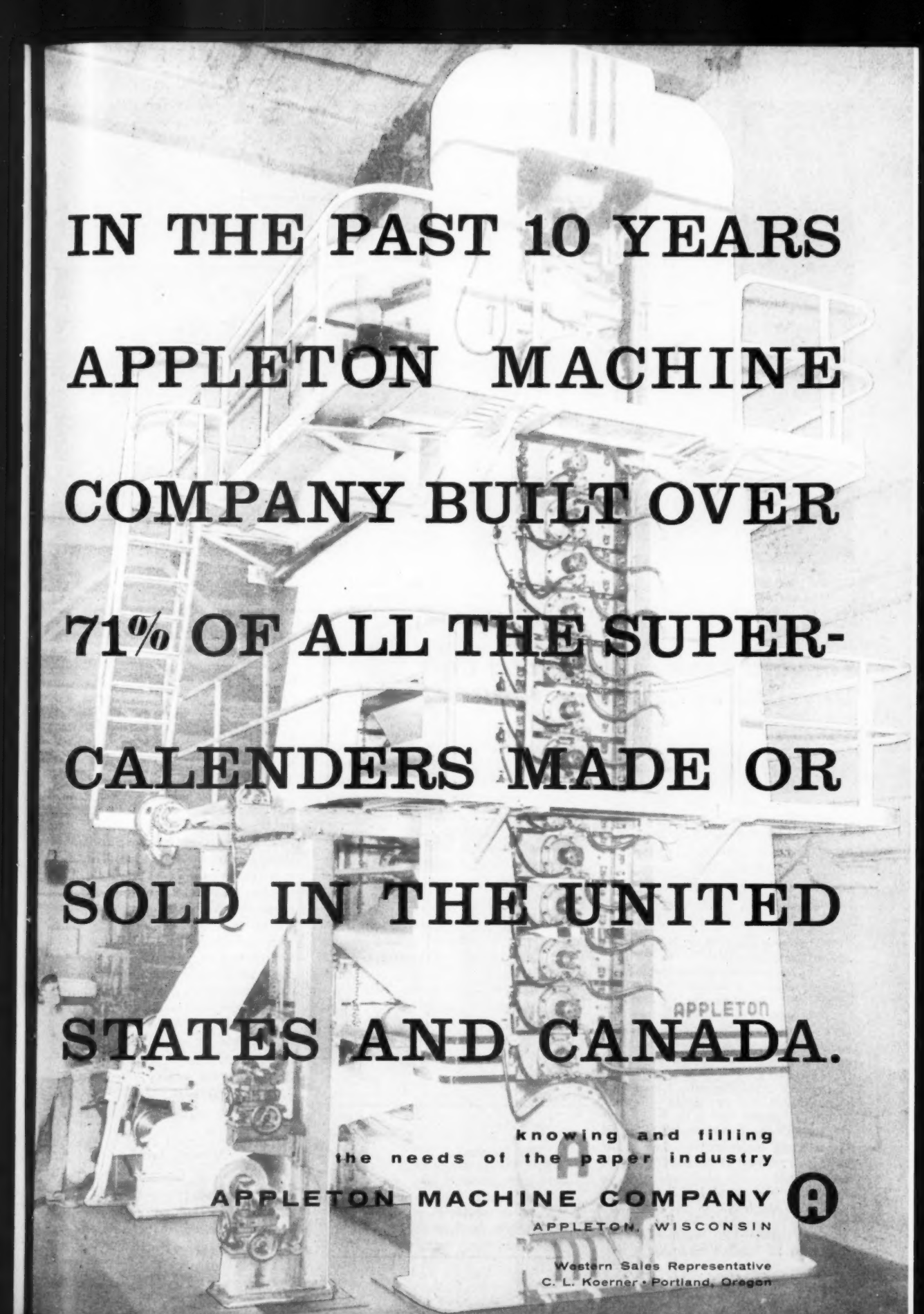
New York Stock Exchange — Bonds

A.P.W. 5%	—	82
Champion P. & F. Co. 3¼%	—	—
Mead Corp. 3%	—	—

American Stock Exchange — Stocks

American Writing	21	22
Brown Company	21⅞	20⅝
Puget Sound (New)	21¾	60

°Closing Bid and Asked Prices.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NEWS of the INDUSTRY

CRANE LOADS the new CNR car through the open top. The car, designed and built by the railway, can safely transport 29 cords of pulpwood in high-speed trains and offers flexibility in loading and unloading

PULPWOOD LOGS tumble from experimental car as the huge side gates are released. This "roll-out" method is said to greatly reduce the amount of manual unloading. Tests conducted so far have been favorable

Forward Look in Pulpwood Cars Unveiled by Canadian National

REDUCTION OF THE over-all cost of moving wood from the woods to the mill has prompted Canadian National Railways to reveal a new design in pulpwood cars. Such rail movement, the railroad reasoned, should be treated as a portion of the manufacturing process.

According to the CNR, recent test runs have led to the following tentative conclusions:

1. The car is practical for both manual and mechanical loading.
2. The time consumed in loading the new car equals or betters the time required for a racked flat car.
3. Mechanical loading of the new car is faster because "bumping" is eliminated; ("bumping" is a process that lines up the log ends for safe movement on a racked flat car).
4. Wood either manually or mechanically loaded can be moved safely in high-speed trains.
5. When the car is loaded with all logs at right angles to the length of the unit, it is practical to use a pusher blade in unloading.
6. When the wood has been loaded parallel to the length of the car, it can be partially unloaded by the roll-out method, reducing the number of logs that must be handled manually.

A serious problem to railways has been the use of mechanically-loaded flat cars and gondolas in the shipment of pulpwood on double-track routes, where protruding sticks (or the spilling of an entire load) can become a very real safety hazard. The only alternative has been to load wood by hand into box cars — an expensive proposition.

Open-top Crib

Investigation of the problem indicated that a solution would be the construction of an open-top crib with movable sides. The open top permits the loading and unloading of bundles of wood by a crane equipped with grapples, slings or other mechanical means.

The dimensions of the car are as follows:

Inside Length	50' 10"
Average Inside Width	9' 6"
Inside Height	9' 6"
Extr. Height Above Deck	9' 10¼"
Height of Load	8' 0"
Width, out to out	10' 6"
Capacity (approx.)	138,000 lb.
Maximum Load (approx.)	140,700 lb.

Based on rough green spruce, balsam or jack pine weighing approximately 4700 lb. per cord, it is estimated that the car will handle 29 cords. The capacity would be reduced to about 25 cords of hardwood.

Skeleton Steel Sides

The crib consists of two sturdy steel end frames and skeleton steel side frames and fitted with four 9' 6" sliding doors on each side. The ends, side frames and doors have an inside skin of heavy-duty chain link wire mesh to aid in retaining the load.

The doors, 9' 6" wide and 8' 8" high, are hung from the top only on a slide bar and are so arranged that the end door can be slid in behind the center door or vice versa; thus, two doors on each side can be opened at any one time to give a total side opening of 19 ft. for loading or unloading. Additionally, the doors can be swung out from the bottom to clear the load or to allow part of the load to roll off without handling.

Manual Loading

The manual loading is much the same as with a box car. With the door nearest the end of the car open, wood is stacked in the 6-ft. end section as in a box car. When this

section is fully loaded, wood is then piled in the doorway section. When these sections are fully loaded, the position of the doors is changed to expose the center 19 ft., where the piling is again done as with a flat car. Due to the length of the car and the door arrangement, it is possible to work two crews on each car.

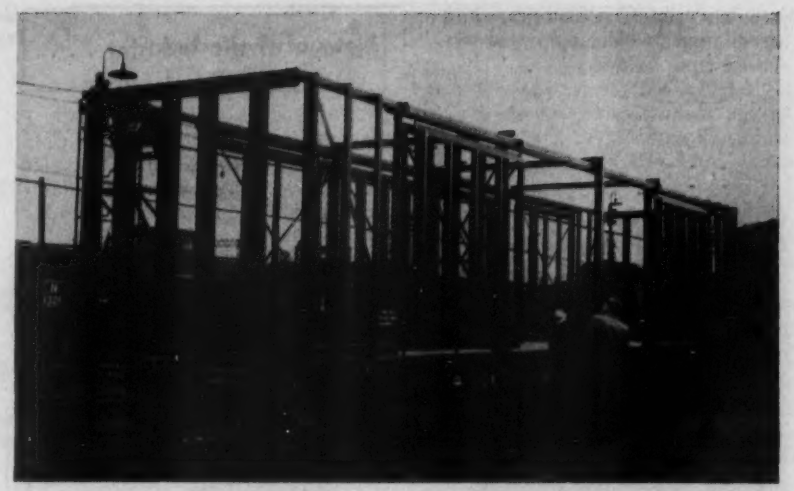
Mechanical Loading

Before starting mechanical loading, the car should be checked that all doors are properly closed and latched. The unit can now be loaded mechanically with any type of equipment capable of reaching over the sides. With the exception of the three cross ties — which are so positioned as to give the least possible interference, the top is completely open for convenient use of orange peal-, grapple- or sling-handled wood.

Unloading can be done manually, mechanically, by gravity or a combination of these.

Mechanical unloading can be by crane; or, by opening directly opposite doors, the wood can be pushed off as is done with flat cars, leaving only the two end pockets and the odd sticks missed by the pusher blade.

If with mechanical loading the sticks are lengthwise of the car, a good portion of the load will roll off when the doors are released.



STEEL-FRAMED, wire mesh box built atop a 50-ft. steel flat car is a capsule description of CNR's newly developed pulpwood carrier. Here, railway officials examine the unit as it left the shops. The side gates can either be opened as shown or be released at the bottom and opened outwards, hinging from the top

Merger of Long-Bell and International Approved

A plan for the merger of Long-Bell Lumber Corp. and Long-Bell Lumber Co. into International Paper Co. has been approved by the respective boards of directors. Under terms of the plan, International would be the continuing company.

Long-Bell Lumber Corp. owns a majority of the outstanding capital stock of Long-Bell Lumber Co., which is an important United States producer and merchandiser of lumber and Douglas fir and Ponderosa pine plywood. Its principal properties — woodlands, sawmills and plywood plants — are in the Pacific Northwest. The firm also operates retail building material stores and jobbing houses in several states.

Earlier this year, International reported that if the merger is completed a mill will be constructed in Oregon to initially produce bleached and unbleached paper and paperboard. Consideration is also being given to the eventual production of newsprint.

Hammermill Expansion

The directors of Hammermill Paper Co. at a recent meeting in Erie, Pa., approved in principle a four-year plant development program designed to make the Erie mill one of the nation's most modern producers.

Estimated to cost $4,000,000 during the first year alone, the project primarily involves the construction of a new finishing room and the expansion of Neutracel pulp-making facilities.

A Hammermill spokesman has stated that the multimillion dollar development will improve working conditions and enable the plant to turn out higher quality paper at lower cost.

Kitimat Pulp Plant Called "Uncertain"

Construction of a pulp and paper plant at Kitimat, B. C., "is quite uncertain," Powell River Co. Ltd. shareholders were told recently. According to H. S. Foley, president of Powell River, Kitimat Pulp & Paper Co. is however continuing studies of the project.

(Kitimat is a joint effort of Powell River and Aluminum Co. of Canada.)

"The company has received a preliminary report on forest resources of the area," Foley explained, "that shows a heavy percentage of overmature, decaying timber. This has an important bearing on cost of extraction per unit of useable wood."

He added that because of the unprecedented demand for aluminum there is some uncertainty as to when Alcan will be able to make power available for the proposed plant. "Construction and operating costs in this region will require close scrutiny," Foley concluded.

$30,000,000 Mill Planned for Mississippi

Plans have been revealed to construct a $30,000,000 kraft pulp and paper mill near Columbus, Miss. The plant, which is to be operated by Mississippi Pulp & Paper Co., will have a daily production capacity of about 500 tons.

The first of its kind in northeastern Mississippi, the mill will use an estimated 300,000 cords of pulpwood annually. Operation is scheduled for early in 1959.

Foresight Pays Off for Charmin Paper

Back in 1951, Charmin Paper Mills Inc. of Green Bay, Wis., planned for a possible future emergency when it installed its new No. 1 paper machine. A spare Yankee dryer was purchased.

That foresight paid off recently when the original dryer developed a crack of undetermined origin. The spare was installed in the record time of nine days, thus preventing a shut-down that might have extended to six months.

Maintenance crews worked around the clock to install the new unit. The 50-ton dryer was skidded into

place on a crib of railroad ties, while the floor over which it traveled was shored from below.

The cracked dryer was shipped to the manufacturer, where a new iron shell will be cast. The shaft and other parts will be salvaged.

Cola G. Parker Sees Continued Prosperity

A former president of Kimberly-Clark Corp. who now speaks for the National Association of Manufacturers has predicted continued economic prosperity for 1956. Despite

some flattening out, declared Cola G. Parker, 1956 should be a better business year than was 1955. (Parker is president of the NAM and a K-C director.)

The "confidence factor"—an all-important element—is behind the prosperity of the United States economy, he said. ". . .A confidence, for instance, on the part of the businessman that even though today his sales may be a little under yesterday's the situation is purely temporary. A feeling that gives him the confidence to put more money into his business, to build more plants."

Expansion of Storage Underway at Pensacola

St. Regis Paper Co. has under construction at its Pensacola, Fla. Kraft Center a $1,500,000 storage facility for hardwood chips and the pulp made from them. Completion of the project will provide the firm with approximately 300 tons of hardwood pulp per week.

Equipment includes two 80-ft. chip silos and two 60-ft. pulp storage chests, both 36 ft. in diameter, as well as extensive conveying equipment. St. Regis' softwood pulp mills will process the hardwood chips on a one-day-a-week basis.

The storage chests are of pre-stressed tile construction. The stored pulp will have a relatively low water content. Each of the chip silos has a capacity of 200 cords and will be used for storing pine and hardwood chips as required.

New Jersey Plant May Reclaim Newsprint

A group of newspapers headed by the *Newark News* of Newark, N. J., may build near Trenton a plant for the manufacture of newsprint from waste newspapers. The News recently filed an application seeking permission to take water from the Delaware-Raritan Canal.

The project involves a 285-ft. building in which used newsprint will be reclaimed by a new process.

Owens-Illinois Merger With National Container Approved by Directors

Merger of Owens-Illinois Glass Co. and National Container Corp. was authorized recently by the directors of both firms. The action has been recommended for shareholders' approval.

Under terms of the proposed merger, stockholders of National Container would receive 1,028,739 shares of Owens-Illinois common and 822,991 shares of the new 4 per cent cumulative convertible preferred, $100 par value.

If shareholders of both companies approve the merger, the newly formed corporation will begin operations about October 1.

(Turn to Page 503)

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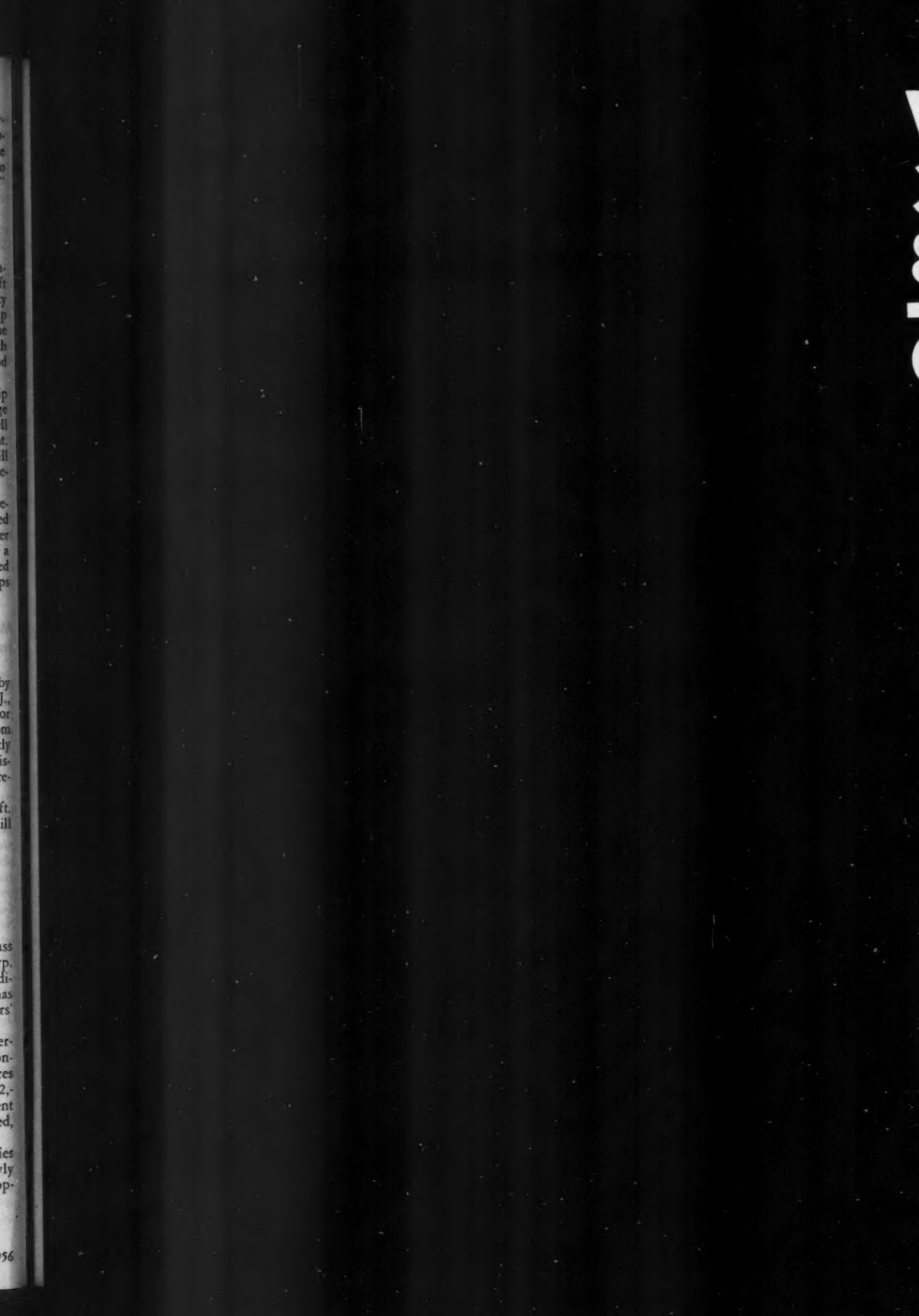

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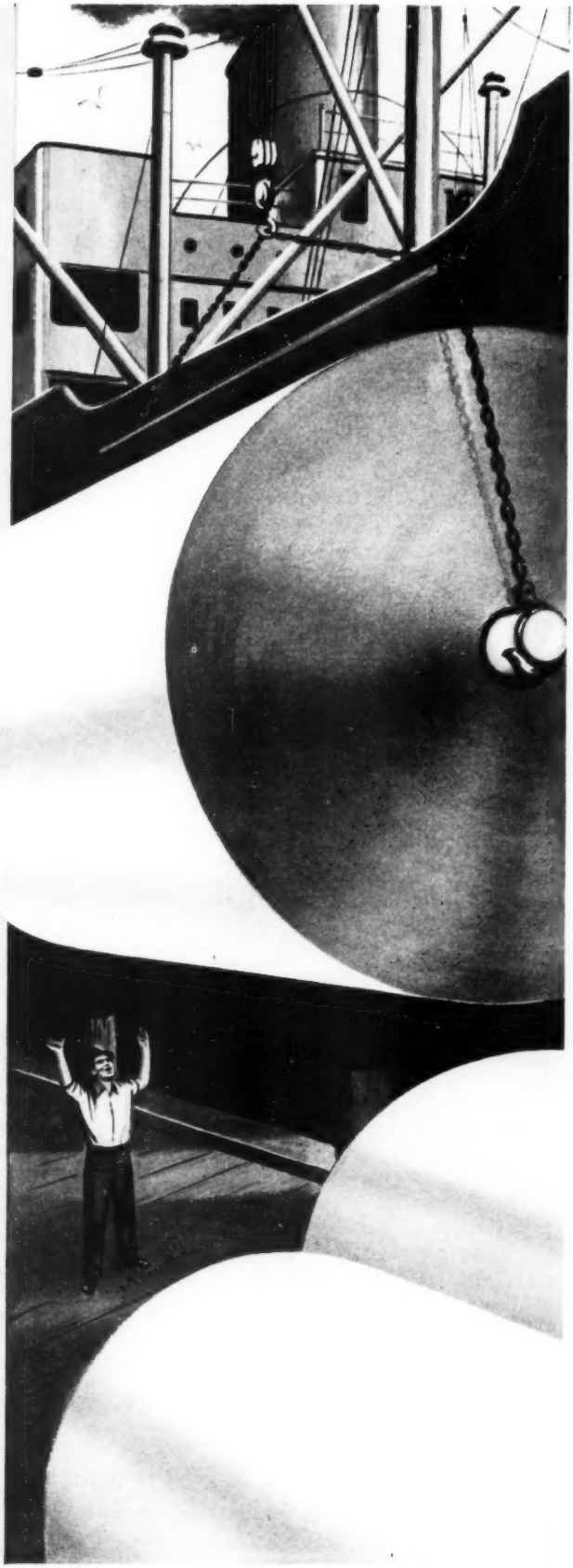

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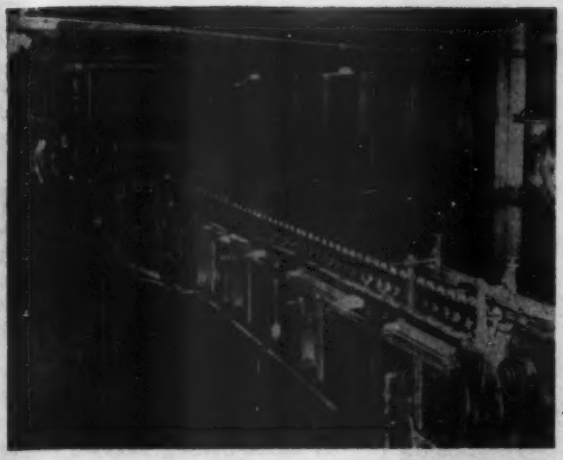

VIEWS OF the rebuilt fourdrinier now in operation at the Russell, Mass. mill of Westfield River Paper Co. Inc. that will enable the plant to produce additional grades and types of paper. Further expansion will include more modern bleaching facilities.

Paper Machine Installation Completed by Westfield River at Russell, Mass.

The first reel of paper recently came off the fourdrinier machine that has been installed at the Russell, Mass. plant of Westfield River Paper Co. Inc.

The unit, which was formerly located at the firm's Manayunk Mill at Manayunk (Philadelphia), Pa., was entirely rebuilt by J. H. Horne & Sons Co. of Lawrence, Mass.

The wire was lengthened to 80 ft., an increase of 15 ft. An Allis-Chalmers Mfg. Co. Vari-Speed drive was added, together with eight new dryers. The machine is driven by a new steam turbine at speeds of up to 700 fpm.

(Westfield River purchased Glassine Paper Co. at W. Conshohocken and Manayunk, Pa., in 1945. The Manayunk mill was later sold when one of its paper machines and the supporting facilities could no longer produce the types of paper required by the firm.)

The new machine is part of a general expansion program that also includes more modern bleaching facilities, wider super-calendering and duplex rewinding.

Caution Urged by Zellerbach

The newsprint and pulp business will be in "a state of overproduction" within two years, according to a recent warning voiced by James D. Zellerbach, president of Crown Zellerbach Corp.

Speaking at a press conference in Vancouver, B. C., Zellerbach foresaw the development of a price war unless the industry is "wise about it."

The remedy, he said, is to "hold expansion for a year or two" and, if necessary, curtail output to 85 or 90 per cent of what it is now.

Part of the trouble arises, Zellerbach explained, because "a lot of people are announcing expansions who have never been in the business before and who have never lived through a depression. . . . Kraft pulp and board are likely to be in over-production next year and newsprint in two years."

Expansion planned in the United States board and paper industry in the years 1956 through 1958 will amount to "about $2 billion," which will mean an annual capacity increase of 5,000,000 tons. Zellerbach pointed out that since present capacity is about 32,000,000 annual tons production would thus be increased by 12 to 13 per cent per year. This while normal demand calls for a yearly increase of only about 3 per cent.

Brown Co. Takes Step Toward Utilization

A commitment to purchase the capital stock of three firms in North Stratford, N. H., has been announced by Brown Co. of Berlin. The companies involved are Granite State Veneer Inc., Plywood Products Inc. and Stratford Realty Corp.

The three firms are operated as one property for the production of high-grade veneer and plywood products from northern hardwoods, particularly yellow birch and hard maple.

According to A. E. Harold Fair, president of Brown, "The purchase is in furtherance of Brown Co.'s policy of complete utilization of the mature timber in its forests and those of its neighbors in the Berlin area."

News of the Industry . . .

The properties will be operated in coordination with Brown sawmills, and the waste materials will be handled at Brown's pulp mills for use in the manufacture of pulp and paper.

To Expand in Oregon

Plans for doubling the capacity of its newly acquired manufacturing plant

Brightness?

Alberta Hi-Brite

see Page 447

MANUFACTURE OF CORRUGATED board at the new Chicago plant at Wabash Fibre Box Co. begins at this end of the Langston 85-in. corrugator. It is equipped to make A, B and C flutes. Starch equipment in the background is used to prepare adhesive

Wabash Fibre Box Opens Chicago Plant

The latest innovations in corrugated container manufacturing are the boast of the new Chicago plant of Wabash Fibre Box Co. Now in full operation, the facility has a capacity of 480,000,000 sq. ft. yearly.

A feature of the plant is the 85-in. Langston corrugator, which is 320 ft. in length and produces corrugated board at the rate of approximately 125,000 sq. ft. per hour. The unit has a two-way loud speaker system for inter-communication by the operating crew. The Reliance Electric drive units are located in a room adjacent to the corrugator.

Included in the other new pieces of equipment installed by Wabash Fibre Box are four two-color printer-slotters, one rotary slotter, one eccentric slotter, one partition slotter, one slitter, one S&S "ZB" automatic folder-taper capable of handling up to 5000 units per hour, two hand tapers, several stitchers and the usual complement of smaller machines.

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for Bermico electrical conduit and sewer pipe at Corvallis, Ore., have also been reported by Brown.

President Fair stated that, "growth of Bermico sewer pipe, drainage and irrigation pipe and electrical conduit business on the West Coast warrants immediate expansion of the Oregon mill."

Brown purchased the Corvallis plant of Blacfiber Pipe Co. in June as an addition to its Bermico production facilities in New Hampshire.

Minnesota Mining to Build $10,000,000 Indiana Plant

A $10,000,000 paper converting plant will be built on a 36-acre site at Hartford City, Ind., by Minnesota Mining & Mfg. Co. It will process raw paper stock produced by Hartford City Paper Co., a 3-M subsidiary.

Construction was to begin August 1, with full production scheduled for July 1, 1957.

The St. Paul Minn. parent firm recently announced a $1,500,000 improvement program for Hartford City Paper, which is now underway.

Sirrine to Design Tennessee Mill

The proposed multimillion dollar kraft pulp and board mill that will be built on the Tennessee River by Tennessee River Pulp & Paper Co. will be designed by J. E. Sirrine Co., Greenville, S. C. consulting engineers. The plant is to be located between Sheffield, Ala., and Savannah, Tenn.

Gunnar W. E. Nicholson, president of the paper firm, has announced that the plant will be built for a yearly capacity of 200,000 tons of linerboard and corrugating medium. The start-up is scheduled for the second half of 1959. The production is to be used by the participants in Tennessee River Pulp & Paper:

Bell Fibre Products Co. of Marion, Ind.; Central Fibre Products Co. of Hutchinson, Kans.; Cornell Paperboard Products Co. of Chicago; Hoerner Boxes Inc. of Keokuk, Iowa, and the Ohio Boxboard Co. of Rittman.

U.S. Paper Consumption in Astronomical Figures

A nation's living standard can be measured by the availability of paper. Low per capita consumption is characteristic of backward countries.

If you took all the paper produced in the United States last year and made it into a yard-wide strip it would stretch all the way to the planet Mars and back—over 70,000,000 miles. And there would be enough left over to circle the earth more than 800 times, according to statistics compiled by the Union Bag & Paper Corp.

But we still have to import an extra 5,000,000 lb. of paper a year to meet our needs. No country in the world produces and uses as much paper as the United States—New York City alone uses more paper than all of South and Central America.

Per capita use in this country is almost 400 lb. a year as compared to less than 5 lb. a year for the continent of Asia.

Industry Sponsors Forest Genetics at N. Carolina State

The School of Forestry at North Carolina State College in Raleigh has begun a five-year regional program in forest genetics. Sponsoring the project, which is aimed at improving southern woodlands, are 11 pulp and paper firms and the agricultural experiment station at the state college, the latter having invested $10,000 in the program.

Dr. Bruce J. Zobel, one of the nation's top geneticists and former silviculturist with the Texas Forest Service, will head the study. In addition to North and South Carolina, the project will initially cover the states of Virginia, Georgia and Tennessee. Principal species involved will be loblolly pine and pond and short-leaf pine.

Pulp and paper firms, each of which has invested $1500, involved in the project are: Camp Mfg. Co., Franklin, Va.; Gair Woodlands Corp., Savan-

nah, Ga.; Champion Paper & Fibre Co., Canton, N. C.; Union Bag & Paper Corp., Savannah; West Virginia Pulp & Paper Corp., Georgetown, S. C.; Bowaters Southern Paper Corp., Calhoun, Tenn.; North Carolina Pulp Co., Plymouth, N. C.; Chesapeake Corp. of Virginia, West Point, Va.; Riegel Paper Corp., Bolton, N. C.; International Paper Co., Georgetown, S. C., and Halifax Paper Co., Roanoke Rapids, N. C.

Dierks Construction Underway at Pine Bluff

More than 20 per cent of the foundation work has been completed for the $10,000,000 kraft mill being built at Pine Bluff, Ark., by Dierks Paper Co. The announcement was made by Rust Engineering Co. of Pittsburgh, which is designing and constructing the 150-ton per day mill. Production is scheduled for November 1957.

Mill facilities will include five buildings, the largest of which will be 566 ft. by 55 ft. Of this space, 420 ft. by 55 ft. will be devoted to the machine room, while the remainder will house digester, pulp-washing and screen rooms.

A 166-in. Bagley-Sewall permanent cantilever fourdrinier, with the suction couch mounted as an integral part of the cantilever mechanism, has been ordered from the Paper Machine Div. of the Black-Clawson Co.

The plant will produce high-grade kraft linerboard from pulpwood grown on Dierks' timberlands in Arkansas and Oklahoma.

Mando Upgrades No. 3 at International Falls

Principal results of a recent upgrading operation on Minnesota & Ontario Paper Co.'s No. 3 machine at International Falls, Minn., were higher paper quality and increased production.

According to the firm, No. 3 is "now one of the most modern specialty paper machines in the industry." It is capable of producing a large variety of groundwood and chemical papers at speeds of from 300 to 1200 fpm.

Main emphasis was at the wet end of the unit. The press system was arranged to provide two straight-through suction presses and smoothing press. Suction box widths were also changed.

The couch roll and drive were

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raised, with the suction box being moved toward the couch roll. The dandy roll was relocated, and new wire guide rolls and the wire guide on the return wire run were replaced.

The headbox and slice were replaced. A Valley headbox and slice were installed, as were Bauer centricleaners. Alterations were made to the press section. A Porier vacuum control system was added, as well as four Bird screens.

New York & Penn to Install Fourdrinier

A new fourdrinier machine will be installed at the Lock Haven, Pa. mill of New York & Pennsylvania Co.

No date has been set for beginning the task of installation, but it is expected that the machine will be in full production early next year. Peter S. Paine, president of New York & Pennsylvania, has reported that the unit will add substantially to the firm's output of paper for the commercial printing, bound book and writing paper fields.

Expected daily capacity of the machine running at 650 fpm is 100,000 lb.

Primarily intended for the production of offset paper, the unit's 108-in. trim will allow New York & Penn to turn out paper to suit the requirements of printers using new 52-in. Harris-Seybold, Miehle and Hoe presses. The machine is also adaptable to the 49-in. width used in letterpress printing.

W. Michigan College National Pulp Reference Center

Western Michigan College at Kalamazoo has been established as the national center for reference pulp distribution by Tappi. The announcement of the cooperative venture was made by Dr. A. H. Nadelman, head of the school's paper technology department, and Dr. R. G. Macdonald, executive secretary of Tappi.

The reference pulp will be used for calibration of laboratory beaters. The plan was worked out through the efforts of F. E. Caskey, chairman, and members of the Tappi pulp testing committee.

Orders for reference pulp should be sent to the Tappi national headquarters in New York, N. Y.

Tree Farms Show Acreage Gains

The American Tree Farm System of private woodland management gained over 4,000,000 acres in 1955, according to figures announced by American Forest Products Industries Inc., sponsor of the program. Forty states participate in this program which is intended to give public recognition to private landowners who voluntarily protect their woodlands from fire, insects, disease and destructive grazings and who harvest for repeated crops.

Georgia moved into national leadership during 1955, adding over a million acres. Mississippi leads in the number of certified tree farms, 826. Four new states, Kentucky, Iowa, Illinois and Utah joined the program last year, and Wisconsin, which had restricted its program to industrial holdings, expanded it to include all classes of private ownership.

It is expected that at least 6,000,000 acres will be added to the program in 1956, as private woodland owners recognize the value of timber as a crop.

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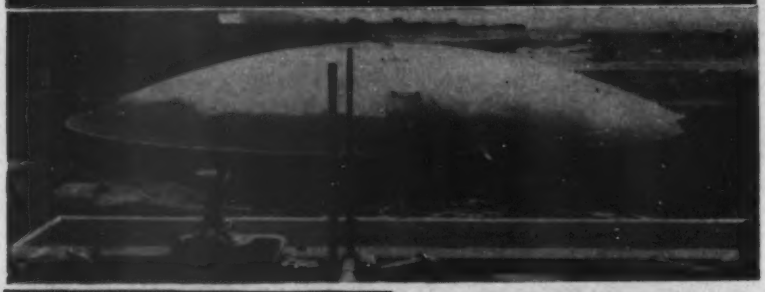

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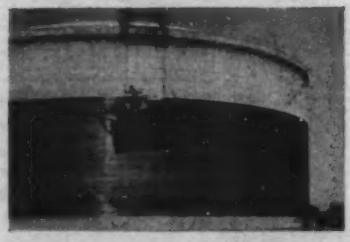

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Recent Expansions in the Industry

Seaman Paper Co. of Massachusetts Inc.
of Otter River reports the start-up of a new 124-in. Yankee fourdrinier. Daily production is expected to be 30 tons of sulfate and sulfite machine-glazed papers, semi-crepe wadding and tissue in both white and colors. Total daily production at the mill is thus boosted to 55 tons.

Kimberly-Clark Corp.
of Neenah, Wis., has announced the purchase of 100 acres at New Milford, Conn., as the site for a proposed creped wadding plant. Completion of the 300,000-sq. ft. manufacturing and converting mill is scheduled for the spring of 1958.

The Mead Corp.
of Dayton, Ohio, has purchased a 1000-acre plant site on the Savannah River near Calhoun Falls, S. C. The firm's proposed use of the site was not immediately announced.

Puget Sound Pulp & Timber Co.
has purchased for an estimated $1,750,000 the sawmill of Eureka Mills Ltd. at Nanaimo, B. C. The purchase price included 250,000,000 board feet of timber, logs and lumber inventory.

Union Bag-Camp Paper Corp.
has purchased substantially all the assets and business of American Creosoting Co. of Louisville, Ky. Included are approximately 38,000 acres of Georgia timberland near Union Bag's Savannah pulp and paper mill. Elected president of the new subsidiary was T. T. Dunn, Union Bag executive vice president.

Sutherland Paper Co.
of Kalamazoo, Mich., has taken option on a 2100-acre tract near Augusta, Ga., as a probable site for a pulp plant.

Federal Paper Board Co. Inc.
has reported in New York, N. Y., that its merger with Morris Paper Mills of Chicago has been approved by the stockholders of both firms. The Midwestern properties will be operated as the Morris Paper Mills Div. The consolidation makes Federal one of the largest producers of boxboard and folding cartons in the nation, now having a total of 16 paperboard mills and carton plants.

The Northwest Paper Co.
of Cloquet, Minn., is seeking the purchase of a tract of land for the expansion of its Brainerd plant. The move follows the recent announcement of plans for a $300,000 addition to its present facilities.

Pacific Waxed Paper Co.
of Seattle has become a subsidiary of Pollock Paper Corp., Dallas, Texas. The move by the parent firm, St. Regis Paper Co., makes the Pollock-Pacific group one of the top three producers of waxed food wrappers in the nation.

Western Corrugated Inc.,
a recently organized Oregon corporation, will construct a corrugated box plant at Beaverton. The facility is expected to cost about $300,000.

Columbia River Paper Mills
will build a two-story addition to its main offices in Portland, Ore.

American Box Board Co.
of Grand Rapids, Mich., will build a plant for the manufacture of corrugated shipping containers in St. Louis. The company's first facility in the area, it will boast 112,000 sq. ft.

British Columbia Forest Products Ltd.
has started construction on its $38,000,000 pulp mill at Crofton on Vancouver Island, B. C. Operation is expected in late 1957.

Kyova Fibre Pipe Co.
is a recently organized firm with plans to construct a plant at Ironton, Ohio, for the manufacture of black fiber pipe for electrical cable conduits and sanitary and drainage use. The firm is a venture of William D. Kyle Jr., former president of Line Material Co. of Barton, Wis. Cost of the plant, equipment and operating materials has been estimated to be about $2,000,000. (Black fiber pipe is a paper roll impregnated with coal tar pitch and practically insoluble to most sanitary and drainage liquids.)

United States Gypsum Co.
has signed a contract to purchase a plant site in Superior, Wis. The firm will manufacture plaster and plaster board for the upper Mideast and Midwest markets.

Crane & Co. Inc.
of Dalton, Mass., has confirmed reports that it is negotiating to buy Byron Weston Co., also of Dalton. According to Bruce Crane, president, plans are to retain the Weston firm at least for the present as a separate organization.

Sherman Paper Products Corp. of California
with headquarters in Los Angeles has announced that it is building a $250,000 converting plant at Seattle. Fabricating equipment is on order. The plant will serve the Pacific Northwest and western Canada.

Opacity?

Alberta Hi-Brite

see Page 447

Yoder Engraving Co.,
a subsidiary of Gardner Board & Carton Co. at Middletown, Ohio, has announced plans for the construction of a graphic arts center. Cost of the project has been estimated at $800,000. In addition to new equipment, some old equipment will be moved from the present Yoder plant in Hamilton.

La Cellulose d'Aquitaine S. A.,
French paper manufacturer, will build a mill in the Pyrenees Mountains to produce an annual 30,000 tons of high alpha content pulp based on beechwood as raw material. The construction contract has been awarded to the Parsons & Whittemore-Lyddon Organization of New York, N. Y. Total capital requirements are approximately $11,500,000. Equipment will be procured by P&W largely in France, but a substantial quantity will be purchased through the Black-Clawson Co.

General Container Corp.
has announced that its corporate name has been changed to St. Regis Container Corp. Business operations will be continued as before with the same operating divisions and subsidiaries. (St. Regis Container is a subsidiary of St. Regis Paper Co.)

Allied News Briefs . . .

Looms with a total weaving surface of 1970 in. will be added this year to the production facilities of **Lockport Felt Co.** A unit 650 in. in width will be installed at Starkville, Miss., along with others of similar construction; while 480- and 600-in. looms will be installed at the Newfane, N. Y. headquarters.

Chain Belt Co. of Milwaukee has established two new sections — Industrial Equipment and Construction Machinery — in a change in organization structure. While the present divisional structure will remain unchanged with each division responsible for its own operations, it is now planned to group the divisions in accordance with the major end use of their various products.

Fischer & Porter Co. has opened a sales office in Pensacola, Fla., to cover the Gulf coast portions of Florida, Alabama and Mississippi.

A seminar for adhesive and board sales engineers was staged recently by **Samuel M. Langston Co.** at Camden, N. J. The aim of the conference was to help improve manufacturing technique and quality control in the corrugated container industry.

Stadler, Hurter & Co. has moved its offices from the Drummond Bldg. in Montreal to 1501 St. Catherine St. West.

F. C. Huyck & Sons of Rensselaer, N. Y., has purchased all the outstanding capital stock of Waldorf Instrument Corp. of Huntington Station, L. I. The move is in line with Huyck's policy of diversification. Waldorf designs and supplies hydraulic servo components for jet aircraft engines and helicopters and various electronic, hydraulic and electro-mechanical control devices.

The Bauer Bros. Co. has acquired all patent, manufacturing and distributive rights to the Grenco continuous digester. These rights have been acquired from Grenco Inc. of Seattle. Bauer is now in a position to furnish almost any diversified continuous or automatic cooking system available.

Fischer & Porter Co. has changed the name of its Chlorination Div. to the Water & Waste Div. in order to more accurately describe the firm's activities in water treatment, sewage treatment and in the industrial waste field. James F. Haskett has been named assistant general manager, and John J. Fetch has been named production manager.

National Starch Products Inc. at Meredosia, Ill., has doubled its production capacity of polyvinyl acetate polymers.

Appleton Wollen Mills announces the completion of four new steps in the continuation of its modernization program to produce more and larger felts for the paper industry. Other plant modernization projects are currently under way.

Cramet Inc., Chattanooga, Tenn., now jointly owned by **Crane Co.** and **Republic Steel Corp.**, is the first titanium producing factory to be especially designed and equipped for that purpose.

Crucible Steel Co. of America and its affiliate, **Rem-Cru Titanium Inc.**, have announced a joint $400,000 improvement program for increasing titanium processing facilities at Crucible's Part Works in Pittsburgh.

Borg-Warner Corp., Chicago, has acquired the assets of **Industrial Crane & Hoist Corp.** Industrial produces a wide range of overhead and other types of cranes.

West End Chemical Co., Westend, Calif., has developed a new lime

Star Performers on Important Duties

AURORA® Non-Clog Pumps, both Vertical and Horizontal have won high favor

— for industrial by-products, semi-solids, wastes, municipal sewage plants, lift stations, buildings and all duties involving the handling of heavy liquids and liquids containing solids.
AURORA Always PUMPS
Type KGG Aurora Horizontal Non-Clog Pump
Write for BULLETIN 121
Write TODAY for CONDENSED CATALOG "M"
DISTRIBUTORS IN PRINCIPAL CITIES

AURORA PUMP DIVISION
THE NEW YORK AIR BRAKE COMPANY
110 LOUCKS STREET • AURORA • ILLINOIS
INTERNATIONAL SALES OFFICE, 50 WEST ST., NEW YORK 6, N. Y.

News of the Industry . . .

burning and processing plant. This plant will produce extremely high-purity, high-calcium quicklime and hydrate.

A long-range planning section has been added to the commercial development department of the Dyestuff & Chemical Div. of General Aniline & Film Corp. The move is part of a general plan for the expansion of commercial development.

Morris Machine Works of Baldwinsville, N. Y., has reported that its new slurry test laboratory enables the determination in advance of friction losses and critical carrying velocities of particular slurries. The firm is thus able to more accurately recommend the most efficient pump and pipe sizes to handle a particular slurry.

Coming Events

Tappi

Sept. 24-26—Third Lignin Round Table, Appleton, Wis.
October 3-4—Eleventh Plastics-Paper Conference, Institute of Paper Chemistry, Appleton, Wis.
Oct. 8-11—Eleventh Engineering Conference, Sheraton-Plaza Hotel, Boston.
Oct. 12-13—New England (joint meeting with Conn. Valley Div. APPMSA), Curtis Hotel, Lenox, Mass.
Oct. 17-18—Sixth Corrugated Containers Conference, Hotel Statler, St. Louis, Mo.

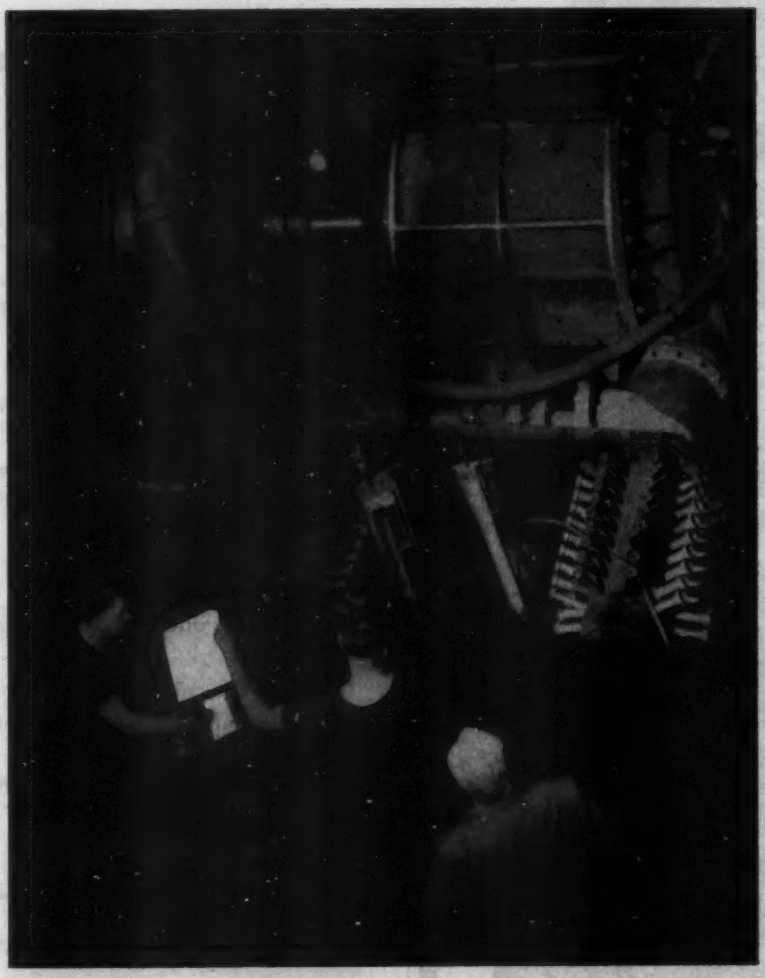
American Pulp & Paper Mill Superintendents Association

Sept. 20-22—Northeastern Div., Poland Spring House, Poland Spring, Maine.
Sept. 21-22—Northwestern Div., Wausau, Wis.
Oct. 5-6—Penjerdel Div., Bedford Springs Hotel, Lenox, Mass.
Oct. 12-13—Conn. Valley (joint meeting with New England TAPPI), Curtis Hotel, Linox, Mass.
Oct. 17-19—Southern and Southeastern Div., (joint meeting), Francis Marion Hotel, Charleston, S.C.

Other meetings

Sept. 17-19—National Paper Trade Association, Conrad Hilton, Chicago, Ill.
Sept. 30, Oct. 1-4—Electrochemical Society, (joint session with Electro-deposition), Statler Hotel, Cleveland, Ohio.
Oct. 22-25—Eleventh Annual Protective Packaging and Materials Handling Exposition, Kiel Auditorium, St. Louis, Mo.
Oct. 29-30, Nov. 1—Electrochemical Society, Statler Hotel, Cleveland, Ohio.
Nov. 14-15—Material Handling Institute Traveling Clinics, University of Buffalo, Buffalo, N. Y.
Nov. 14-15—Material Handling Institute Traveling Clinics, Northwestern University, Chicago, Ill.

Rated performance of every Nash Vacuum Pump is assured by this precise laboratory test

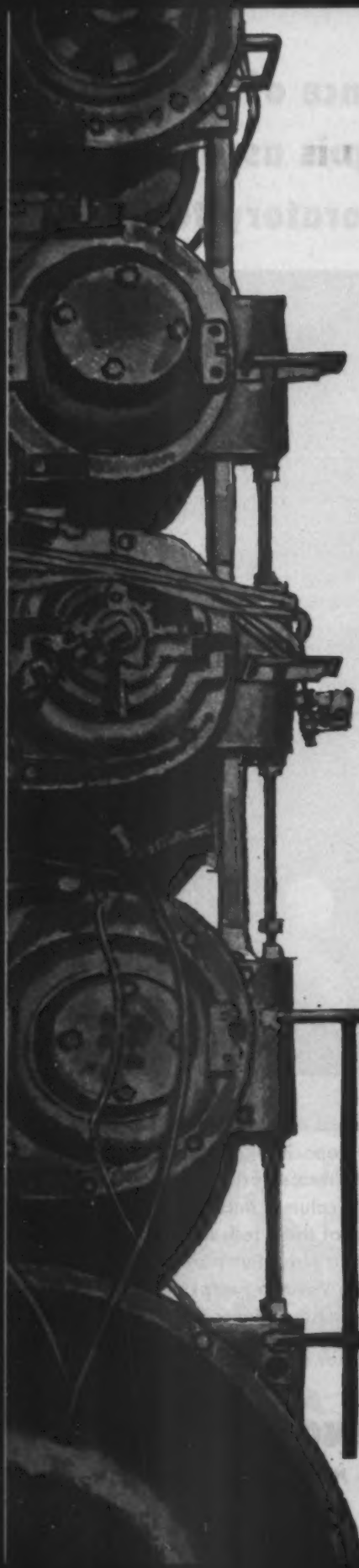


Rated capacities of Nash Vacuum Pumps are not theoretical. Every Nash Pump is tested individually. Air capacity is determined by delivery thru accurately machined and calibrated orifices. Related vacuum is measured by precise mercury column, and horse power is recorded electro-dynamically. Records of these tests are retained by us, and certified copies are available to Nash Pump owners.

That is one of the reasons why Nash Vacuum Pumps are installed in over a thousand leading Paper Mills. An engineer from Nash will be glad to survey your mill, and make recommendations, entirely without obligation to you.

NASH ENGINEERING COMPANY

440 WILSON ROAD, SO. NORWALK, CONN.



To the mill executive who decides on lubricants—

Three good reasons for specifying STANOIL Industrial Oil

1 The increased demand for paper products results in machinery being operated at speeds higher than rated capacity. Continuous production has placed greater burdens on lubricating oils. Without the best lubrication, equipment failures may occur. Best idea is to specify STANOIL Industrial Oil.

2 Cost of repairs and replacement of parts added to the loss of production, run many times the cost of lubrication. A small investment in STANOIL Industrial Oil is the best possible protection against bearing failures, repair costs and production loss.

3 STANOIL Industrial Oil can be used in a multitude of applications. Inventories of lubricants can thus be reduced and the danger of lubrication failure due to misapplication can be cut or even eliminated.

Get more facts about STANOIL from your nearby Standard Oil lubrication specialist. There is one near you in any of the 15 Midwest and Rocky Mountain states. Or write Standard Oil Company, 910 South Michigan Avenue, Chicago 80, Illinois.

Quick Facts About STANOIL Industrial Oil

- **Stability**—STANOIL's antioxidant gives oil resistance to chemical change, minimizes deposits.
- **Rust Prevention**—Inhibitor in STANOIL "plates out" on metal surfaces, prevents corrosion.
- **Cold Starts**—STANOIL has low pour point. Flows freely from cold start. No need for costly warm ups.
- **Resists Effects of Temperature Change**—STANOIL has high viscosity index, is resistant to temperature change. Lubricates in both high and low temperature service.
- **Has Excellent Demulsibility**—STANOIL is refined to eliminate emulsion problems, contains additive to minimize foaming.

STANDARD OIL COMPANY
(Indiana)

STANDARD

NAMES in the NEWS

Dr. Roy P. Whitney Advanced by Institute

Dr. Roy P. Whitney, chairman of the chemical engineering department, has become dean of the Institute of Paper Chemistry upon the retirement of Dr. Harry F. Lewis, who will continue to hold his post as vice president.

Appointed to the Institute staff in 1947, Dr. Whitney was a member of the MIT faculty during World War II, on full-time loan to the development laboratory of the Chemical Warfare Service. After the war, he was director of the department of industrial cooperation and professor of the department of chemical engineering at the University of Maine.

Dr. Whitney has been honored by the American Institute of Chemical Engineers for his outstanding contribution to the literature of chemical engineering.

East Texas Pulp & Paper Co. Elects New Officers

A new slate of directors and executive officers has been announced by East Texas Pulp & Paper Co.

Charles L. Stillman, executive vice president and treasurer of Time, was elected to head the board of East Texas as chairman. Also serving as directors are David W. Brumbaugh, vice president and secretary of Time; R. M. Buckley; Arnold W. Carlson, comptroller and assistant secretary of Time; W. J. Carter; Artemus L. Gates; Roy E. Larsen, president of Time; R. A. McDonald, and W. E. Merrem.

Buckley was named as president of the pulp and paper firm. Together with Larsen and Brumbaugh, he joins Stillman and McDonald on the executive committee.

Dr. John O. Burton Advanced by Mando

Minnesota & Ontario Paper Co. announces the appointment of Dr. John O. Burton to director of research. He succeeds M. S. Wunderlich, who has attained retirement age.

Dr. J. O. Burton

M. S. Wunderlich

Dr. Burton moves to his new position with over two decades of pulp, paper and fiberboard research experience behind him.

He joined the company in 1937 as research chemist. In 1954 he was appointed assistant director of research, a position he has held since.

Mr. Wunderlich joined the company in 1938 as a research engineer. In 1942 he became sales manager and was appointed director of research in 1945.

Directors of Crown Zellerbach Corp. have elected **Reed O. Hunt**, vice president for operations since 1954, a director and member of the executive committee. He replaces the late **Thomas McLaren.**

R. O. Hunt

P. W. Horeyseck

Paul W. Horeyseck has been appointed superintendent of the board mill of the Gair Cartons Div. of Robert Gair Co. Inc. Horeyseck was formerly manager of the American Coating Mills Div. board mill at Middletown, Ohio. **Walter R. O'Keefe Jr.** was chosen to replace Horeyseck at Ohio, and **Henry G. Booth** has become assistant superintendent of the board mill at Thames River Div. at Uncasville, New London, Conn. to replace O'Keefe.

George A. Richter, director of research for Brown Co. from 1919 to 1940, has rejoined the Berlin, N. H. pulp and paper manufacturing company as research consultant. Richter retired last April as superintendent of the wood cellulose division of Eastman Kodak Co., which he joined in 1940.

Dr. R. A. Diehm has been promoted to a full professorship in paper technology at Western Michigan College. Dr. Diehm, former executive vice president and general manager of Ward Paper Co., came to the faculty a year ago as an associate professor.

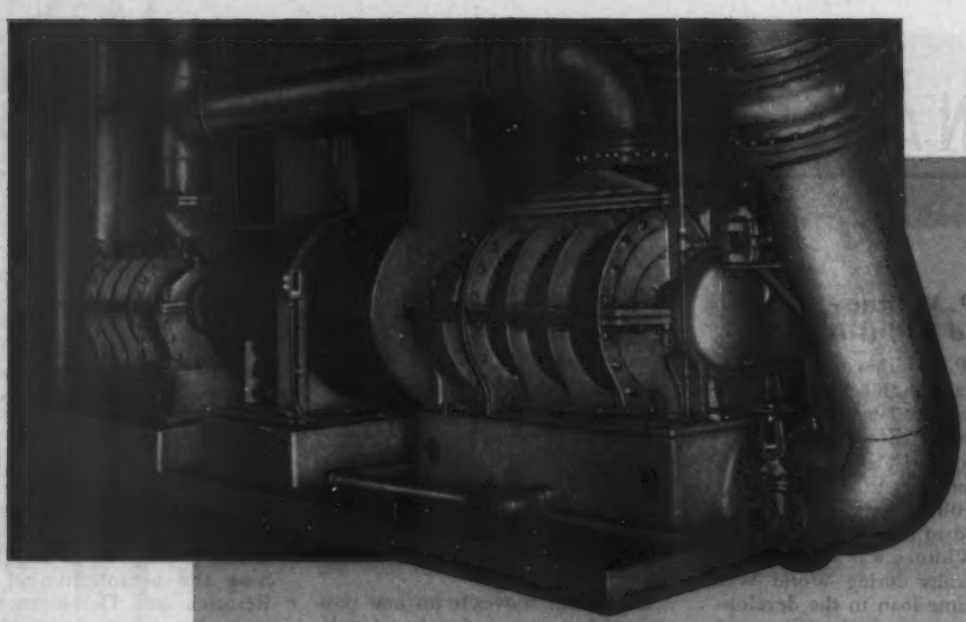
Dr. Alan H. Vroom has been appointed director of research for Consolidated Paper Corp. Ltd. He has been responsible for the planning and organization of the new Research and Development Center to be located at Grand Mere, Que. Prior to his joining Consolidated, Dr. Vroom spent four years with the Development Center of Weyerhaeuser Timber Co. at Longview, Wash., where he served as chief of the applied physics section and later of the applied chemistry section.

J. Frank Gray of River Raisin Paper Co. has retired from the office

Strength?

Alberta Hi-Brite

see Page 447



For the world's largest Yankee tissue machine...

R-C Vacuum Pumps keep production rolling at 3000 fpm

At Crown Zellerbach Corporation's St. Helens mill in Oregon, the world's largest Yankee tissue machine, with a 258-inch wire, is producing 100 to 120 tons per day at a speed of 3000 fpm.

To provide the required vacuum for the pressure roll, suction wire boxes, wringer roll, suction couch, pickup and felt conditioners, there are seven Roots-Connersville vacuum pumps to supply approximately 33,000 cfm of air at 10 to 20" Hg vacuum.

Five important operating factors have proved the performance of these R-C Positive Displacement Vacuum Pumps:

- ***Reduced horsepower at higher speeds*** **(600 rpm and up) creates power savings up to 25% and far lower first cost of motors.**
- ***Single-stage or two-stage units*** **in capacities for all requirements.**
- ***Proved reliability and low maintenance*** **with no internal contacts or excessive wear and freedom from down-time and maintenance.**
- ***Minimum sealing water*** **from 4 to 40 gpm, unaffected by water temperature.**
- ***Small floor space*** **with less expensive foundations and lower cost per cubic foot of capacity.**

R-C Positive Displacement Vacuum Pumps purchased for this installation

- Two 18 x 40 single-stage pumps
- One 14 x 15 single-stage pump
- Two 14 x 14 two-stage pumps

For evidence of how other leading industrial users benefit from these advantages, write for Bulletin 50-B-13.

ROOTS-CONNERSVILLE BLOWER

A DIVISION OF DRESSER INDUSTRIES, INC.

956 Walker Ave., Connersville, Indiana. In Canada—629 Adelaide St., W., Toronto, Ont.

Names in the News . . .

of chairman of the board. However, he will continue as a member of the board of directors. Mr. Gray was one of the original directors in 1910 and re-elected annually since. He was president from 1939 until 1946. No successor to Mr. Gray as chairman of the board was announced.

Thomas C. Hanna has been elected to the board of directors of Missisquoi Corp., an affiliate of Standard Packaging Corp. He will continue in his capacity as vice president of Missisquoi.

Thomas Hanna

Robert Simpkins

Robert Simpkins was named engineering department manager of Nekoosa-Edwards Paper Co. succeeding **Clarence Watson,** who became eligible for retirement some time ago and will continue in the department in a staff capacity.

John D. Warner has been appointed to the newly created position of woods manager for the Trenton, Ont. mill of Hinde & Dauch Paper Co. of Canada Ltd. He was formerly with West Virginia Pulp & Paper Co. as a field representative.

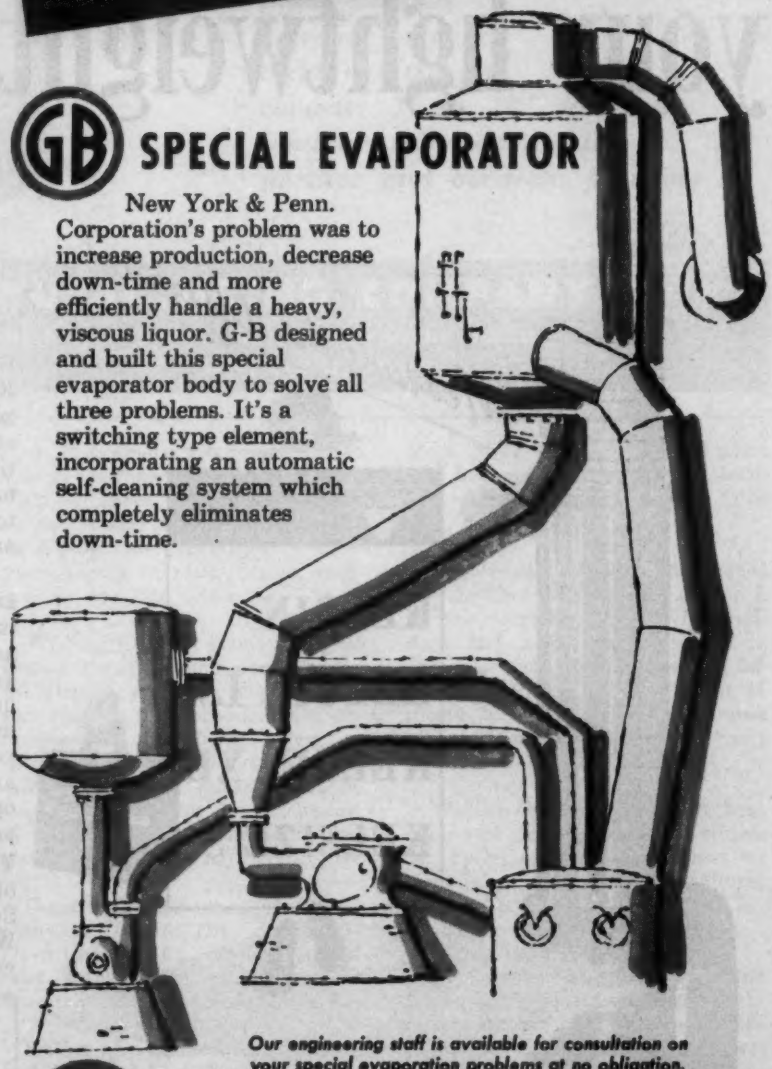
John Warner

Paul Leigh

Paul Leigh, former consulting and application engineer with Westinghouse Electric Corp., has been appointed power superintendent of Charmin Paper Mills Inc., Green Bay, Wis.

Something Special...

may solve YOUR problem!



GB SPECIAL EVAPORATOR

New York & Penn. Corporation's problem was to increase production, decrease down-time and more efficiently handle a heavy, viscous liquor. G-B designed and built this special evaporator body to solve all three problems. It's a switching type element, incorporating an automatic self-cleaning system which completely eliminates down-time.

Our engineering staff is available for consultation on your special evaporation problems at no obligation.

GOSLIN-BIRMINGHAM
MANUFACTURING CO., INC.
BIRMINGHAM • ALABAMA

How to get measurable increase in densometer of your lightweight papers

Remarkably efficient film formers, Kelco's unique sodium alginates, applied at size press, lay continuous films of controllable penetration. This effectively closes up lightweight sheets, measurably raises their densometer test, improves printability, uniformity and smoothness.

Completely non-tacky, the Kelgins and Kelsize S appreciably improve machine operation and reduce "set-asides" caused by picking on the driers and calender rolls. You produce higher quality lightweight papers at faster machine speeds than ever before. If you make lightweights, the Kelgins and Kelsize S, test-proven for easy operation and high quality production, are worth your quick consideration.

YOURS ON REQUEST: Free Sample of the Kelgins and Kelsize S, *plus* new Surface Sizing Technical Bulletin. Without obligation, write today to your nearest Kelco regional office.

KELGIN, KELGIN LV, KELGIN XL, KELSIZE S . . . Products of

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Announcing the NEW **HANCHETT**

MODEL SK-24

SLITTER KNIFE GRINDER
for
Top or Bottom SLITTERS
WET GRIND

- *finest finishes*
- *extreme accuracy*
- *rigid construction*
- *capacity 3" to 24" diameter*
- *semi or fully automatic*
- *positive and accurate fixturing*

HANCHETT MANUFACTURING COMPANY

World's Largest Manufacturer of Knife Grinding and Saw Sharpening Machinery

MAIN OFFICE — Big Rapids, Michigan WEST COAST — Portland 1, Oregon

Allied Personalities . . .

Olin W. Callighan, manager of paper sales for Minerals & Chemicals Corp. of America, has been presented an honorary master of science degree by Western Michigan College at Kalamazoo. In the presentation, Callighan's service to the school and to the industry was cited.

Melvin F. Knack has been appointed a technical service representative for Lockport Felt Co. He was formerly mill manager for River Raisin Paper Co. at Monroe, Mich.

Harry E. Douglass Jr. of the Engineering Dept. at Birmingham, Ala., has been assigned to the Chicago office of Chicago Bridge & Iron Co.

Westinghouse Electric Corp.'s transportation and generator division has appointed six engineering department managers: **J. W. Batchelor,** turbine-generator engineering; **M. R. Lory,** ac motor and generator engineering; **E. H. Myers,** dc motor and generator engineering, **E. C. Whitney,** water-wheel and synchronous condenser engineering; **G. L. Moses,** services engineering, and **R. A. Baudry,** development engineering.

A. P. Schnyder has joined Lumus Co. as consulting engineer for the Pulp & Paper Mill Div. He was formerly with Ebasco Services Inc. as a pulp and paper mill engineer participating in plant design, engineering and site selection.

Whiting Corp. of Harvey, Ill., has elected the following new officers: **W. Hebble,** manager of production planning, as vice president for operations; **W. A. Morey,** patent attorney and manager of research, as vice president for research, and **N. C. Swigart,** director of purchasing, as vice president for purchasing and traffic.

Donald J. Eccleston, previously with the Textile Div. of Hilton-Davis Chemical Co., has been named sales manager for the Northern Branch of Arnold, Hoffman & Co.

Wilbur J. Comerford, formerly with National Lock Washer Co., has been named specialty products engineer for the Alloy Tube Div. of Carpenter Steel Co.

The Black-Clawson Co. has created the post of administrative vice president with headquarters in New York, N. Y. Appointed to the office was **Robert F. Vokes,** vice president and general manager of the Dilts Div.

Morningstar, Nicol Inc. has named new officers, as follows: **Laurent J. La Brie,** formerly assistant vice president and now vice president in charge of technical coordination; **Edwin M. Hillary,** vice president in charge of production, and **Thomas Wood Morningstar,** assistant vice president and secretary.

William F. Burchfield has been appointed supervisor and **Kenneth M. Spicer** assistant supervisor of technical service in the International Nickel Co.'s Development and Research Div.

Ed Crowley is newly appointed Infilco Inc. representative for southeastern states. Crowley has been with Infilco for five years. He was previously with the paper and pulp industry in Houston and Minneapolis.

Charles E. Hill has been appointed chief engineer of Patton Mfg. Co. Inc., Springfield, Ohio.

Howe Scale Co. has announced

PIPE SERVICE
Off The Shelf or Engineered

For pipe service . . . whether it's off-the-shelf items or stock lengths and standard fittings or engineered layouts . . . you can depend on Naylor.

The accuracy of Naylor fabrication guarantees perfect fit, whether your layout is simple or complex. You get exactly what you need in pipe, fittings, connections and special fabrications—all built to close tolerances to assure the performance you expect.

It's a service designed to give you the most for your money and to fit into your construction schedule.

Naylor pipe comes in sizes from 4" to 30" in diameter with all types of fittings and connections. Both pipe and fittings are furnished in steel, alloys and stainless steel.

Write for Bulletins No. 507 and No. 525 or send specifications for quotation.

NAYLOR PIPE

NAYLOR PIPE COMPANY

1233 East 92nd St., Chicago 19, Illinois

Eastern U. S. and Foreign Sales Office: 350 Madison Ave., New York 17, New York

the following changes in field personnel: **A. R. Haskins** named manager of the branch in Chicago, **Robert N. Elliott** will be manager in Cleveland, and **Russell A. Anderson** manager of the Howe office in Minneapolis.

James R. Addonizio has been appointed technical sales representative in the New York office of the synthetics department of Hercules Powder Co. Addonizio had extensive production, research and sales experience in the chemical industry before joining Hercules in January.

H. N. Muller Jr. has been appointed chief engineer of Canadian Westinghouse Co. Ltd. Muller was formerly assistant to the vice president, apparatus products, of Westinghouse Electric Corp.

John R. Titlow has been elected director and vice president of Lamson Mobilift Corp., Portland, Ore.

J. K. Moffett Jr. has been transferred to a sales development position for U. S. Industrial Chemicals Co.

Robert W. Stanton Jr. was appointed advertising manager with Conoflow Corp. Stanton, who joined Conflow in 1954, was previously with Fischer & Porter Co.

Frank W. Perry has been appointed manager of the domestic starch department of Stein, Hall & Co. Inc. Perry has been manager of the company's Charlotte, N. C. branch for the past eight years.

Paul E. Christman has been named a turbine specialist for General Electric Co.'s. Pacific Southwest district. Before joining GE in 1950, Christman was employed by Christman Co. Inc.

Bart R. Braznell has been appointed sales manager of the key products department of W-K-M Mfg. Co. Inc. Braznell was with the former Key Co. of E. St. Louis for 26 years.

Necrology . . .

Alfred Suter

Alfred Suter, 67, vice president and a director of the Gaylord Container Corp. Div. of Crown Zellerbach Corp., died in July at Bogalusa, La. He was also general manager of the Bogalusa mill.

Born in Switzerland, Mr. Suter was educated in Germany and later served as manager of an Italian paper mill. He came to the United States in 1923 and became associated with Bogalusa Paper Co., then a subsidiary of Great Southern Lumber Co. and later part of Gaylord Container Corp. Serving successively as chief engineer and general superintendent, he succeeded to the position of general manager in 1955.

Adam K. Luke

Adam K. Luke, for many years treasurer and vice president of West Virginia Pulp & Paper Co. and later vice chairman and honorary chairman of its board of directors, died early in August at the age of 87.

Mr. Luke, member of a pioneer papermaking family, completed more than 60 years of service with West Virginia Pulp & Paper prior to his official withdrawal from the firm in 1950.

He joined the firm, then known as Piedmont Pulp & Paper Co., in 1889 at what is now Luke, Md. He was assigned to the New York, N. Y. office in 1894.

Elected assistant treasurer in 1899, Mr. Luke served in that capacity until 1904, at which time he was elected treasurer, a post he held until retirement in 1945. In addition to his duties as treasurer, Mr. Luke was secretary of the company from 1904 to 1909 and served as a vice president from 1932 until 1945, at which time he was elected vice chairman of the board. In 1948 he became honorary chairman. He had been a director since 1904.

Edward Kerr

Edward Kerr, vice president of the Davey Co. in Downingtown, Pa., died in Philadelpia in July. He was 63.

Mr. Kerr, who had been associated with the paper industry many years, was a 1914 graduate of the University of Pensylvania. He was a member of the American Society of Mechanical Engineers.

S. L. deCarteret

Samuel Laurence deCarteret, 71, board chairman of Canadian International Paper Co. until his retirement a year ago, died late in July in Vancouver, B. C.

A native of New Zealand, Mr. deCarteret came to Canada in 1908

R-W PAPER COMPANY'S recently-completed new mill in Longview, Washington, uses a Cameron Type 19 for the windup end of the new paper machine.

CAMERON . . . for profit-making efficiency . . .

R-W's ultra-modern West Coast mill chooses Cameron winders and slitters

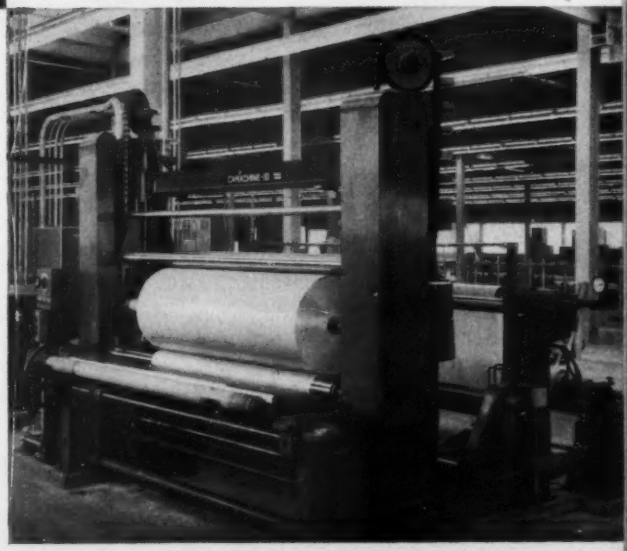
When qualified men start from scratch to build a new paper mill, they'll look for profit-making efficiency through the entire plant layout.

When two well-known firms joined forces in a project to supply glassine and greaseproof papers for the West Coast food packaging industries, it was certain that their new R-W plant would be a model of practical papermaking efficiency.

Everywhere, when men of experience are engaged in plant expansion or new mill projects, *they'll stay with Cameron*. Their favorable experience with Cameron machines on many similar operations is one of the reasons why the builders of the new R-W plant again chose Cameron winders and slitters.

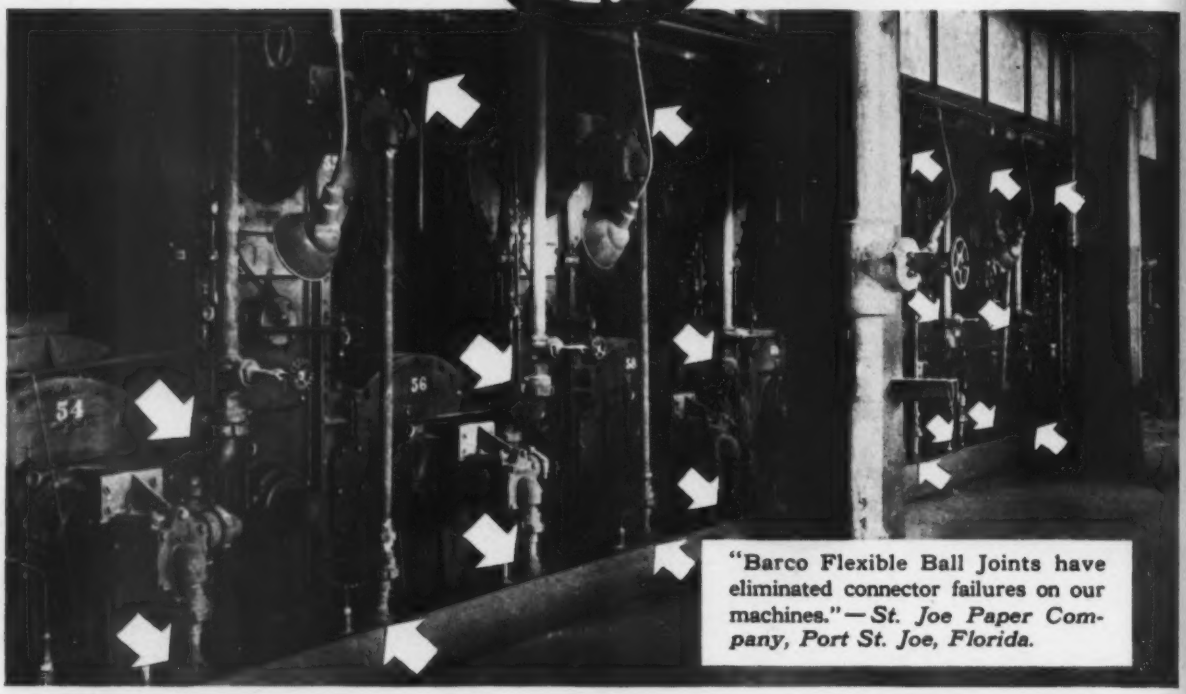
Call or write Cameron for reliable technical information.

GLASSINE *finishing operations at the new R-W mill use two Cameron Type 10-B4 slitter-rewinders, backed up by Type 900 tensions with electric eye side register control.*



CAMERON MACHINE COMPANY Camachine® **61 Poplar Street • Brooklyn 1, N. Y.**

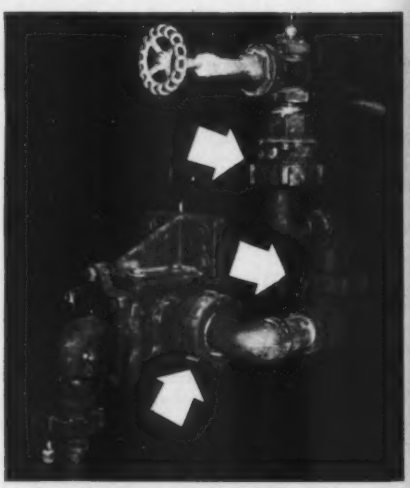
FLEXIBLE BARCO BALL JOINTS



"Barco Flexible Ball Joints have eliminated connector failures on our machines."—*St. Joe Paper Company, Port St. Joe, Florida.*

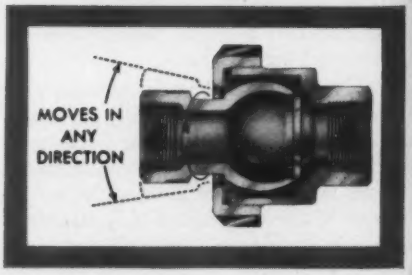
The Solution for "Connector Failures" On New, High Pressure Paper Machines

It is *costly maintenance* when you have to shut down a big paper machine to repair leaking steam and condensate lines connecting dryers with headers. This is why numerous mills and leading machine builders are now using Barco Flexible Ball Joints in assemblies with metal pipe as illustrated here.



At St. Joe Paper Company, Port St. Joe, Florida, Barco Flexible Ball Joints were first installed in 1951 to overcome connector failures in steam lines from headers to dryers on their No. 1 paper machine. They were so pleased with the results that in 1952 they equipped their No. 2 machine completely, using two joints to each of 102 dryers. But that isn't all. So far this year they have installed 217 additional joints of various sizes in headers and other piping—all because of the maintenance-free performance of Barco Joints.

St. Joe maintenance engineers say, "Barco Flexible Ball Joints have eliminated connector failures on our machines and we have had practically no maintenance whatsoever."



Barco has been solving piping movement problems since 1908. If you have a problem, our field engineers are available without obligation.

BARCO *Manufacturing Co.*

526K Hough Street • Barrington, Illinois

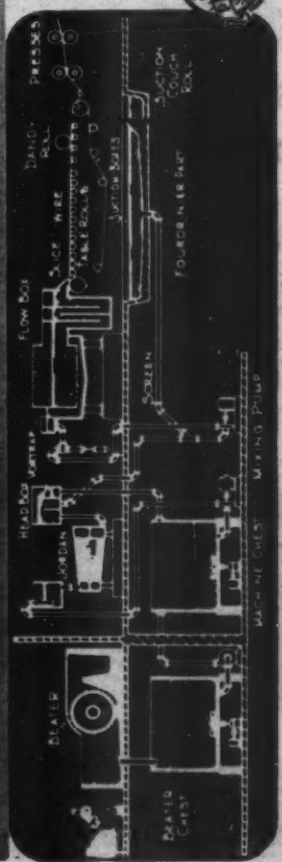
In Canada: The Holden Co., Ltd., Montreal

PERMAG FOR EFFICIENT PAPER MACHINE CLEANING

Write for FREE 16-page handbook: PERMAG Cleaning Compounds for Paper Mills

For every cleaning need there is a PERMAG CLEANING COMPOUND—production proven in extensive use for top efficiency, economy and reliability under all conditions. More than 30 years of development and service in superior cleaning compounds warrant your investigation of these widely approved PERMAG products.

MAGNUSON PRODUCTS CORPORATION
50 Court Street • Brooklyn 1, N. Y.
In Canada: Canadian PERMAG Products, Ltd., Montreal



and later served in executive posts for Brown Corp., Hammermill Paper Co. and Brompton Pulp & Paper Co. He joined Canadian International in 1938 as vice president and general manager. In 1947 he became president and in 1953 was named board chairman.

Nelson C. Hanson

Nelson C. Hanson, 56, general manager of Moyer & Pratt Inc. at Lyons Falls, N. Y., died in August after a short illness.

Well known in the paper industry, Mr. Hanson joined Moyer & Pratt more than 30 years ago and had been general manager for 20 years.

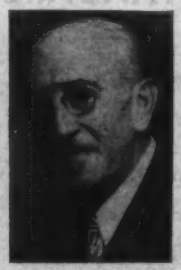
Samuel Simkins

Samuel Simkins, president of National Paper Box Mfg. Co. in Philadelphia, died recently at the age of 63.

Mr. Simkins was also president of Simkins Paper Box Mfg. Co., Philadelphia; Benner Box Inc., Simco Waste Paper Inc. and Miami Paper Board Mills Inc., all of Miami, Fla.

J. W. Rohrbaugh, 47, purchasing director for P. H. Glatfelter Co. of Spring Grove, Pa., died recently after a short illness. He joined the firm in 1925 as an office boy and was promoted in 1929 to the purchasing department, being named to the management team in 1946.

J. W. Rohrbaugh



Elias D. Cohen

Elias D. Cohen, a vice president, director and member of the executive committee of National Starch Products Inc., died July 25. A pioneer in the packaging industry, he was a key figure in the introduction of starch adhesives. Mr. Cohen had been with the firm 55 years.

Harry Clow Boardman, director of research for Chicago Bridge & Iron Co., died in Chicago in early August. From 1910 to 1916 and since 1926 he had been associated with Chicago Bridge. Mr. Boardman had been chairman of the Boiler and Pressure Vessel Code Committee of the American Society of Mechanical Engineers since 1954.

Frank J. Lawless, 86, treasurer of Onondaga Paper Co. of Marcellus Falls, N. Y. died in mid-July. Since the death of his father in 1916, Mr. Lawless had operated the firm with his brothers.

George Thompson Fritz, former vice president and treasurer of Glassine Paper Co. at West Conshohocken, Pa., died in July at the age of 63. A graduate of the Harvard University Law School, he had retired from the company in 1947.

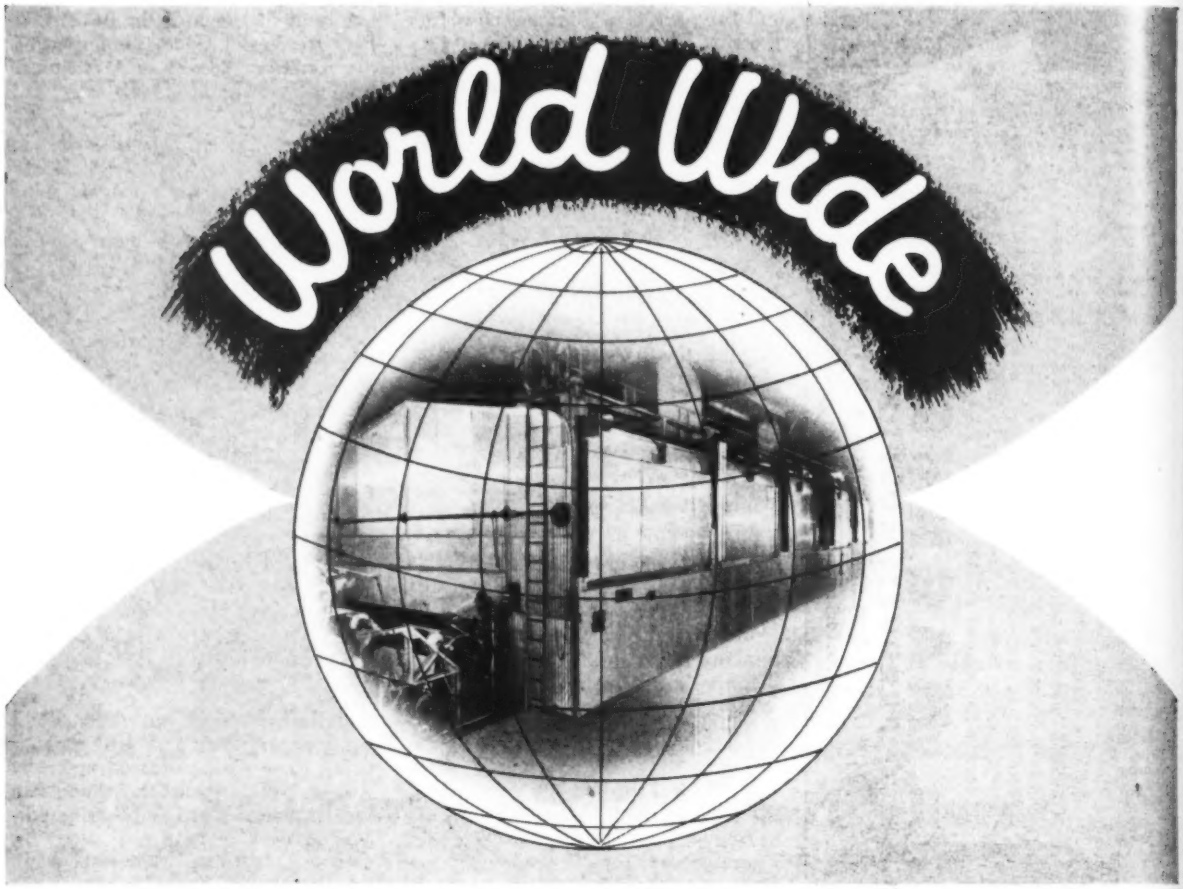
Frederich G. Lust, 49, head chemist at Parsons Paper Co. in Holyoke, Mass., died in August after a heart attack. A native of Germany, Mr. Lust came to the United States in 1949. He had been associated with the paper industry all his life.

Arthur J. Manning, 68, general purchasing agent for Union Bag-Camp Paper Corp., died unexpectedly August 20. He joined the Union Bag organization in 1916 and became purchasing agent in 1936.

Cleanliness?

Alberta Hi-Brite

see Page 447



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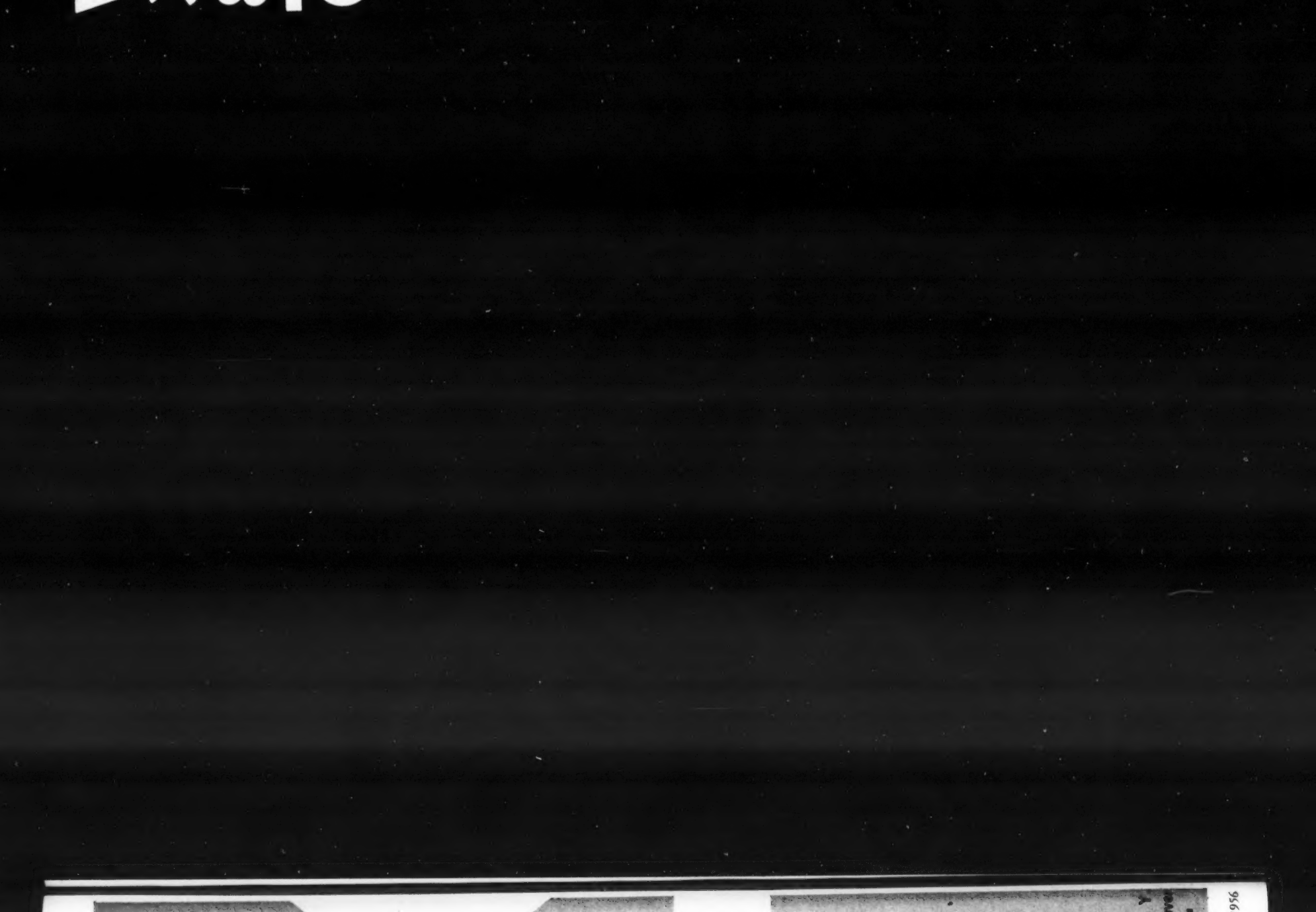

SAFETY NEWS

Six-month Period of NSC Contest Nets 105 Perfect Scores

FOR THE SIX-MONTH period of January to June, 105 of 541 contestants hold perfect scores in the 1956 Paper Industry Safety Contest sponsored by the National Safety Council. This may be compared with last year's six-month period record of 122 out of 535.

The June frequency rate for all divisions was 6.04, and that for the first six months was 6.84, as compared with 7.15 for the January-June period of 1955, at a rate decrease of 4 per cent. In the Pulp & Paper Div. the six-month rate was 6.56, a 6 per cent decrease from a year ago. Paper Converting reported a 7.58 six-month rate, which was a 2 per cent decrease from a year ago. Pulpwood Logging recorded 59.05 for the six-month period, or a 37 per cent decrease from last year.

Perfect scores recorded for the six-month period were as follows:

Division I—Pulp and Paper Mills

Group A

No perfect score

Group B

Coosa River Newsprint Co., Coosa Pines, Ala.; Crown Zellerbach Corp., Port Townsend, Wash.; Munising Paper Co., Munising, Mich.; Mosinee Paper Mills, Mosinee, Wis.; Kimberly-Clark Corp., Terrace Bay, Ont.; Georgia Kraft Co., Macon, Ga.; Riegel Paper Corp., Acme, N. C.

Group C

West Virginia Pulp & Paper Co., Williamsburg, Pa.; Schmidt & Ault Paper Co., York, Pa.; National Vulcanized Fibre Co., Yorklyn, Del.; Falls Paper & Power Co., Oconto Falls, Wis.; St. Regis Paper Co., Sartell, Minn.; Kansas City Star, Flambeau Paper Div., Park Falls, Wis.

Crystal Tissue Co., Middletown, Ohio; Consolidated Water Power & Paper Co., Wis. River Div., Stevens Point, Wis.; Fraser Companies Ltd., Newcastle, N. B.; Congoleum-Nairn Inc., Cederhurst, Md.

Group D

Certain-Teed Products Corp., Savannah, Ga.; Certain-Teed Products Corp., E. St. Louis, Ill.; National Container Co., Big Island, Va.; Crown Zellerbach Corp., Lebanon, Ore.

Mead Corp., N. Leominster, Mass.; Container Corp. of America, Ogden Div., Chicago; Bartgis Bros. Co., Ilchester, Md.; Certain-Teed Products Corp., Niagara Falls, N. Y.

Marathon Corp., Ashland, Wis.; Container Corp. of America, Chattanooga, Tenn.; Riegel Paper Corp., Hughesville, N. J.

Group E

National Gypsum Co., Garwood, N. J.; Celotex Corp., Metuchen, N. J.; Celotex Corp., Cleveland; Robert Gair Co. Inc., Middletown, Ohio; National Gypsum Co., Kalamazoo.

Johns-Manville Co. Ltd., Asbestos, Que.; Kimberly-Clark Corp., Kapuskasing, Ont.; Flintkote Co., Mt. Carmel, Ill.; U. S. Gypsum Co., Oakfield, N. Y.

Kimberly-Clark Corp., Fullerton Mill; Robertson Paper Box Co., Montville, Conn.; International Paper Co., Livermore Falls, Maine; U. S. Gypsum Co., Gypsum, Ohio; Johns-Manville Corp., Tilton, N. H.

Container Corp. of America, Wilmington, Del.; National Vulcanized Fibre Co., Marshall Bros. Div., Yorklyn, Del.; Spaulding Fibre Co. Inc., N. Rochester, N. H.; American Writing Paper Corp., Mt. Tom Div., Holyoke, Mass.; Banner Fibreboard Co., Wellsburg, W. Va.

Division II—Paper Converting

Paper Bags

Thilmany Pulp & Paper Co., Kaukauna, Wis.; St. Regis Paper Co. Ltd., Dryden, Ont.; Pillsbury Mills Inc., Wellsburg, W. Va.; St. Regis Paper Co., Playa Ponce, Puerto Rico.

Boxes and Cartons

Group A

F. N. Burt Co. Inc., Buffalo, N. Y.; Container Corp. of America, Boston; Bartgis Bros. Co., Ilchester, Md.; Container Corp. of America, F-C Div., Manayunk, International Paper Co., Chicago; Container Corp. of America, Oakland, Calif.; Container Corp. of America, Rock Island, Ill.; Robertson Paper Box Co., Montville, Conn.

Mengel Co., Louisville, Ky.; International Paper Co., Springhill, La.

Group B

Crown Zellerbach Corp., Gaylord Container Div., Milwaukee, Wis.; Crown Zellerbach Corp., Gaylord Container Div., Greenville, Miss.; Container Corp. of America, Boyle Ave. Plant, Los Angeles Calif.

Container Corp. of America, Chattanooga, Tenn.; International Paper Co., Kansas City; Crown Zellerbach Corp., Gaylord Container Div., Tampa, Fla.; Mengel Co., Nashville, Tenn.

Container Corp. of America, Santa Clara, Calif.; Mengel Co., New Brunswick, N. J.; Container Corp. of America, Cleveland; Mengel Co., Wiston-Salem, N. C.; Container Corp. of America, Baltimore; Container Corp. of America, Boston.

Container Corp. of America, Greensboro, N. C.; Marathon Corp., Sunnyside, Wash.; Superior Paper Products Co., Mt Wolf, York Co., Penn.; Fort Wayne Corrugated Paper Co., Rochester, N. Y.

Container Corp. of America, Seattle; Container Corp. of America, Cleveland; Bay West Paper Co., Green Bay, Wis.

Hankins Container Co., Little Rock, Ark.; Mott Carton & Paper Co., St. Louis; National Container Corp., Miami.

Roofing Paper

Ruberoid Co., Joliet, Ill.; Ruberoid Co., Dallas; Bird & Son Inc., Chicago; Certain-Teed Products Corp., Kansas City; Ruberoid Co., Minneapolis.

Johns-Manville Corp., Marrero, La.; Johns-Manville Corp., Los Angeles; Flintkote Co., Portland, Ore.

Insulation and Building Board

No perfect score

Specialties

Marinette Paper Co., Fort Edward, N. Y.; Kimberly-Clark Corp., Niagara Falls, Ont.; Lily-Tulip Corp., Augusta, Ga.; Marinette Paper Co., S. Glen Falls, N. Y.

Container Corp. of America, Sefton Fibre Can Co., Piqua, Ohio; Scott Paper Co., Sandusky, Ohio; Line Material Co., Sherman, Texas; Container Corp. of America, New Orleans.

Kimberly-Clark Corp., Winnipeg, Man., Canada; Mid-West Wax Paper Co., Fort Madison, Iowa; Lily-Tulip Cup Corp., Monticello, Ind.

Division III—Pulpwood Logging

Robert Gair Co. Inc., Southern Advance Bag & Paper Div., Hodge, La.

National Safety Congress Set for October 22-25

Keynoter at the forthcoming meetings of the Pulp & Paper Section at the National Safety Congress in Chicago will be R. J. Askin, vice president of Abitibi Power & Paper Co.

The section will meet October 22-25 at the Conrad Hilton Hotel. Presiding will be Francis H. Wagner of the Mead Corp., general chairman.

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Higher paper standards are one result of modern paper making and finishing machinery. Higher production speeds are another. Maintenance of both requires that every equipment component be top quality. For this reason many paper machinery manufacturers specify Acipco steel tubes when they order tubular stock for rolls.

Acipco steel tubes are inherently dynamically balanced and dimensionally stable. Because they are centrifugally spun, with dense, nondirectional grain structure, they are easily machined to close tolerances. Their perfect cylindrical surface accepts the fine finish necessary for many types of rolls. These and other physical and metallurgical characteristics mean better rolls for paper machinery, better production at the mill or plant, and better paper for the consumer.

If you have not discovered these inherently better steel tubes, call the Acipco distributor nearest you for full information.

Acipco centrifugally spun steel tubes are used in the manufacture of calender, engraving, press, slitter, rewinder, plate cylinder, squeeze and starch bath rolls, as well as in hundreds of other industrial applications.

SIZE RANGE: Lengths up to 16' — longer lengths by welding tubes together. OD's from 2.25" to 50"; wall thicknesses from .25" to 4".

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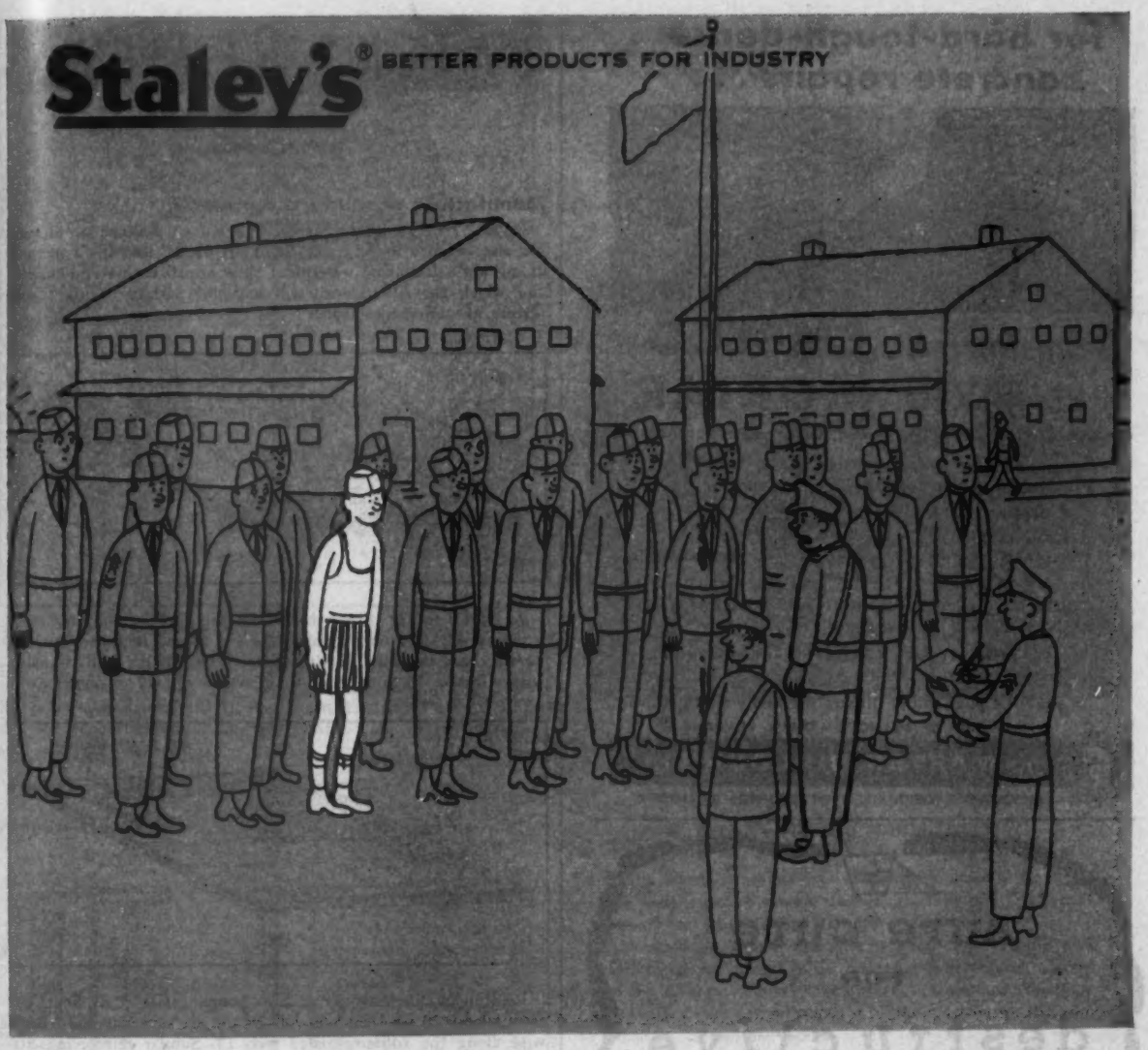

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PATENT REVIEWS

MELVIN NORD*

Manufacture of reinforced paper

U. S. 2,739,092, issued March 20, 1956, to William N. Stevenson and assigned to American Sisalkraft Corp., describes a method of making a laminated waterproof sheet which is thin and supple, and which has an uncalendered, torn-fiber surface having a soft texture something like flannel.

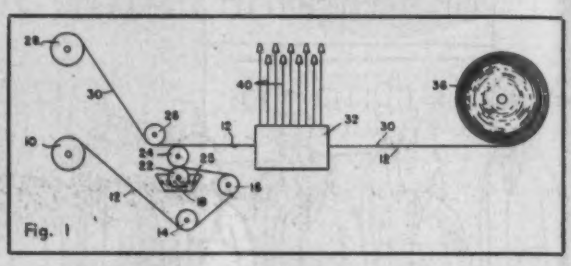


Fig. 1

As shown in Fig. 1, a web of kraft paper 12 is conducted from a supply roll 10 around guide rools 14, 16 and then between roll 22 and back up roll 24 so that one surface of the web is coated with adhesive 25 from tank 18 in which roll 22 is immersed.

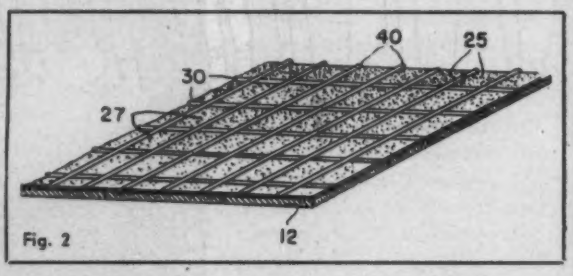


Fig. 2

Reinforcing filaments 30 such as unspun sisal, glass fiber, etc. from supply 28 are led under roll 26 and are superimposed lengthwise along the adhesive-coated web 12. Similar reinforcing filaments 40 are superimposed transversely across the web by the apparatus designated at 32, to form a web of adhesive-coated paper having cross-laid filaments on the adhesive as shown in Fig. 2.

Successive portions of the coated web are then superimposed on each other, by winding the web on the setting-up roll 36, successive convolutions of the web being pressed against each other on the roll 36. The roll hardens to a solid mass.

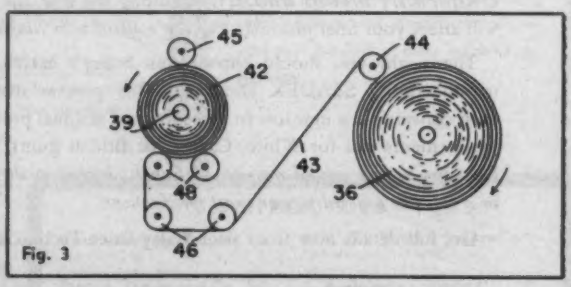


Fig. 3

In the next operation, as shown in Fig. 3, the roll 36 is rewound into the roll 42 by unwinding and peeling the roll 36, starting with the flap 38 which has been left protruding (Fig. 4). As the flap is pulled, a stress occurs at X in Fig. 4, which is op-

*Patent attorney, 17600 Pineburst, Detroit 21.

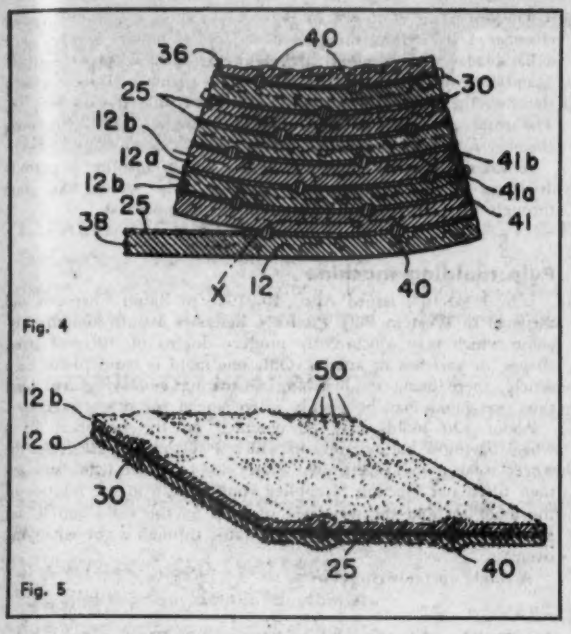


Fig. 4

Fig. 5

posed by the adhesive strength of the adhesive 25 and by the cohesive strength of the web 12. These strengths are such that the paper web itself splits along the dot-dash line 41, thus splitting the paper into plies. The end product thus has the appearance shown in Fig. 5.

Process for deinking printed waste paper

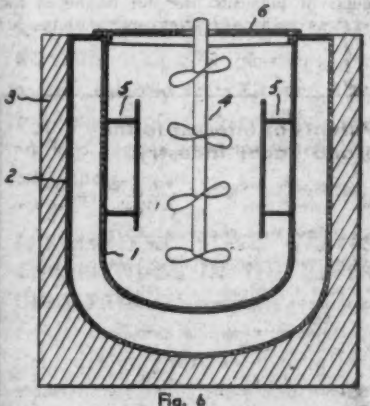


Fig. 6

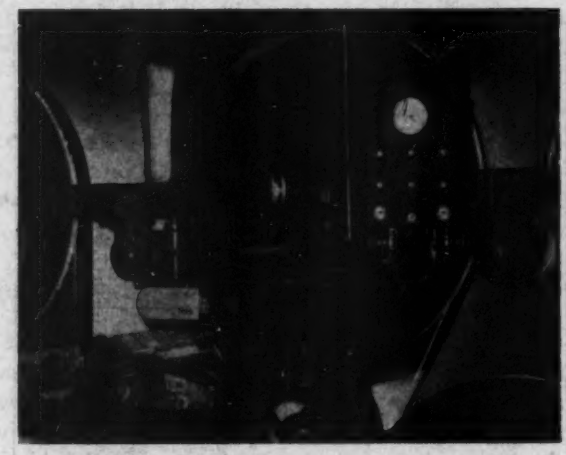
U. S. 2,743,178, issued April 24, 1956 to William J. Krodel and Norman Hackerman, describes a process for deinking paper.

As shown in Fig. 6, the process begins with shredding the waste paper. Zeolite-treated water is then added to form a mixture having a stock consistency not less than 1 percent. The paper-water mix is then passed through a settling trough for removal of foreign matter. After thickening to 1.5 per cent consistency, the stock is fed to a reactor. About 1 per cent of a detergent is added. This loosens the ink binder and emulsifies the ink particles after their separation from the paper. A salt is also added, in order to cause the cellulose and ink particles to have electrostatic charges of the same sign (but different magnitude) instead of opposite signs, thus permitting their separation.

After the sale has been added, the slurry is agitated and heated for ½-2 hrs. at 150-190°F. at atmospheric pressure or slightly higher. In this defibering and cooking operation, the ink particles are repelled from the cellulose fibers and emulsified. The salt may for example be $NA_4P_2O_7$ or $K_4Fe(CN)_6$, ionizing to tervalent or higher valent ions.

When the cooking process is completed, the scum is removed from the top, and electrodes are immersed in the mixture while the agitation is continued. An electric current is passed between the electrodes for about 15 min. or until the separation of ink particles from the cellulose fibers ceases. The scum is removed

Keeps Moisture Content Within 1/2 of 1%



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Patent Reviews . . .

again and the water is drained off. The pulp is then washed repeatedly with water until the ink particles have been substantially removed. Next the pulp is immersed in an acid bath which removes any adsorbed ions that discolor the fibers. The stock is thickened and rinsed, and then diluted to a suitable consistency for going to the wet end of the papermaking machine.

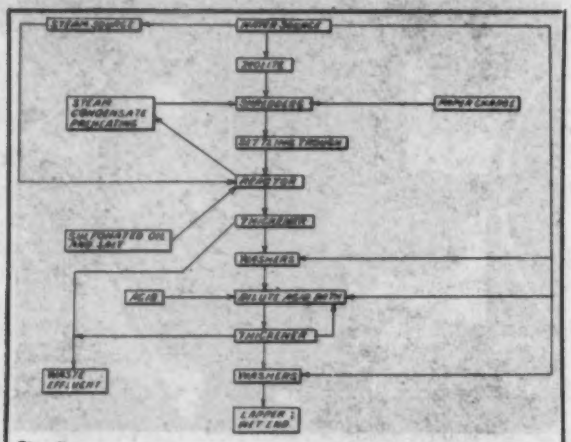

Fig. 7

The apparatus used is shown in Fig. 7. A steam-jacket 2 surrounds the vessel 1. Insulation 3 surrounds the jacket. The stirrer 4 also acts as one electrode, and baffles 5 as the other.

Pitch control in paper making

U.S. 2,743,199, issued April 24, 1956 to Harold E. Corbin and John C. Dean, and assigned to Socony Mobil Oil Co., Inc., relates to the control of pitch in sulfite pulping.

The inventors claim that pitch can be controlled from its inception, and a much faster cooking operation achieved, by introducing into the digester a highly aromatic pitch solvent and an emulsifier or dispersing agent effective in acid medium of pH 5-6.

According to the inventor, the following results are obtained: (a) marked decrease in cook cycle, (b) improvement in screening conditions and pulp cleanliness, (c) reduction in shut-down time in the fourdrinier operation and in the operation of the cylinder machines, (d) more effective control of slime and bacterial growth, and (e) an improved quality pulp.

Refining paper pulp

U.S. 2,741,954, issued April 17, 1956 to Aime L.H. Allibe and assigned to Black-Clawson Co., describes an apparatus for refining paper pulp.

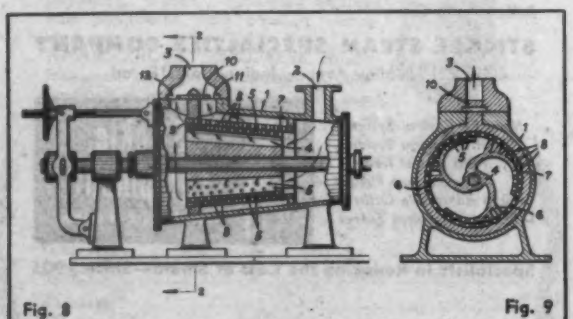
Fig. 8

Fig. 9

The apparatus is shown in Figs. 8 and 9. The conical refining chamber 1 has an inlet mouth 2 and outlet mouth 3. The rotor 4 has blades with a conical helical pitch formed with perforations 5 and longitudinal wings 6. The refining chamber also contains a stator 7, the wall of which is uniformly perforated with holes 8. The rotor and stator may be moved lengthwise in the refining chamber for adjustment.

A variable by-pass valve 10 in the outlet opening 3 permits discharge of a predetermined ratio of pulp which has gone through the stator and pulp which has by-passed it.

Pulp molding machine

U.S. 2,741,165, issued April 10, 1956 to Ralph Chapman and assigned to Western Pulp Products, describes a pulp molding machine which may concurrently produce dozens of different sizes, shapes, or varieties of articles. Only one mold is required for each article, there being no matching or mating molds required, and thus one mold may be readily interchanged for other molds.

About 120 molds may be mounted on the periphery of a wheel having a hollow rim, on which a suction is pulled. As the wheel rotates, molds dip into slurry in a curved tank, and are then lifted out. Suction is applied continuously to the interior of the mold to hold the wet layer of pulp on the mold and to aid in drying it. The molds are then rotated through a curved drying oven.

A single operator is required.

Available chlorine bleaching of sulfite pulp

U.S. 2,741,536 and 2,741,537, issued April 10, 1956, relate to the bleaching of sulfite pulp with a combination of sodium chlorite and chlorine. Both patents are assigned to Olin Mathieson Chemical Corp. The first patent, by William A. Stone, describes a multi-stage bleaching process. The second by William A. Stone and John G. Matarese, describes a single-stage bleaching process.

In each case, substantial savings in chlorine are effectuated when a mixture of sodium chlorite and chlorine is used in the first stage of bleaching, as compared with the use of chlorine alone, such as 20-50 per cent. In addition, savings in caustic for neutralization, in amounts of pigments used for brightness and opacity, and in other steps such as beating and washing, are also effectuated.

Other Patents of Interest to the Pulp and Paper Industry

Subject	Inventor or Assignee	Patent No.	Date
Process and apparatus for drying waxed paper	Ultrasonic Corp.	2,740,202	4/ 3/56
Suction box cover	Appleton Wood Products Co.	2,740,332	"
Bag valving and sleeving apparatus	Multiwall Research Inst., Inc.	2,740,334	"
Cap support	Jacob I. Kaufman	2,740,567	"
Tubular shipping container	Hinde & Dauch Paper Co.	2,740,572	"
Individual cream carton	Florence L. Carter	2,740,573	"
Spacer construction for packing cases	Donald G. Lavey	2,740,574	"
Dispensing container	Rene J. Fontaine	2,740,575	"
Collapsible paper board container	Lester W. Franck	2,740,576	"
Bag	Bemis Bro. Bag Co.	2,740,577	"
Manufacture of composition board	Miller Hofft, Inc.	2,740,990	4/10/56
Apparatus for making paper tubes	Henry Russell Davis, Jr.	2,741,167	"
Bottle carrier	Morris Paper Mills	2,741,399	"
Box having dispensing means	Edward T. Pringle, Jr.	2,741,413	"
Cake-tray	Paul H. Nottage	2,741,414	"
Corrugated board container with interlocking flaps	Curt J. Meitzen	2,741,415	"
Container	Morris Paper Mills	2,741,416	"
Collapsible partitions for cartons	Continental Folding Paper Box Co., Inc.	2,741,417	"
Paperboard carton	Robert Gair Co., Inc.	2,741,418	"
Box and clip construction	National Container Corp.	2,741,419	"
Carry cord handle	Eugene T. Bodard	2,741,420	"
Coated paper	Harry H. Mahler	2,741,564	"
Refining paper pulp	The Black-Clawson Co.	2,741,954	4/17/56
Machine for making bags	Frank Hamachek Machine Co.	2,741,956	"
Carton erecting machines	Sutherland Paper Co.	2,741,957	"
Machine for forming paper cups	Edward W. Bridge, Sr.	2,741,958	"
Machines for corrugating paper	Mollins Machine Co., Ltd.	2,742,079	"

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4. CATALOG 55F (FITTINGS) . . Complete stainless steel fitting catalog giving engineering drawings, dimensions and basic material data.

5. VALVES TO COMBAT CORROSION . . . 75 questions and answers selected from Cooper Alloy valve clinics covering materials, operations, service problems, installation and repair.

6. STAINLESS STEEL VALVES AND FITTINGS IN THE PAPER INDUSTRY . . . Eight page technical article covering alloys, valve selection, design factors, installation, maintenance, operation and inspection of stainless steel valves and fittings used by the paper industry.

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15. NEWSCAST . . . An eight page bi-monthly publication devoted to reporting technical material of value to those interested in corrosion resistant castings, fittings, valves and pumps.

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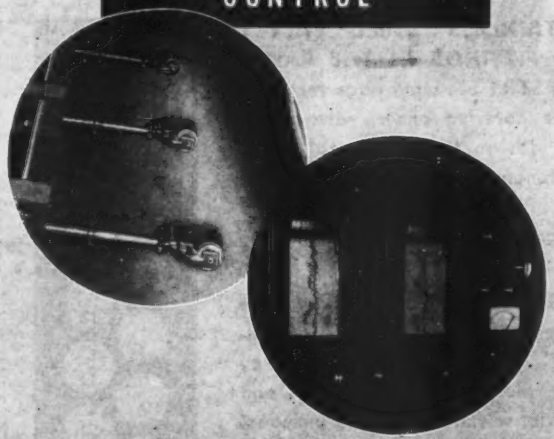

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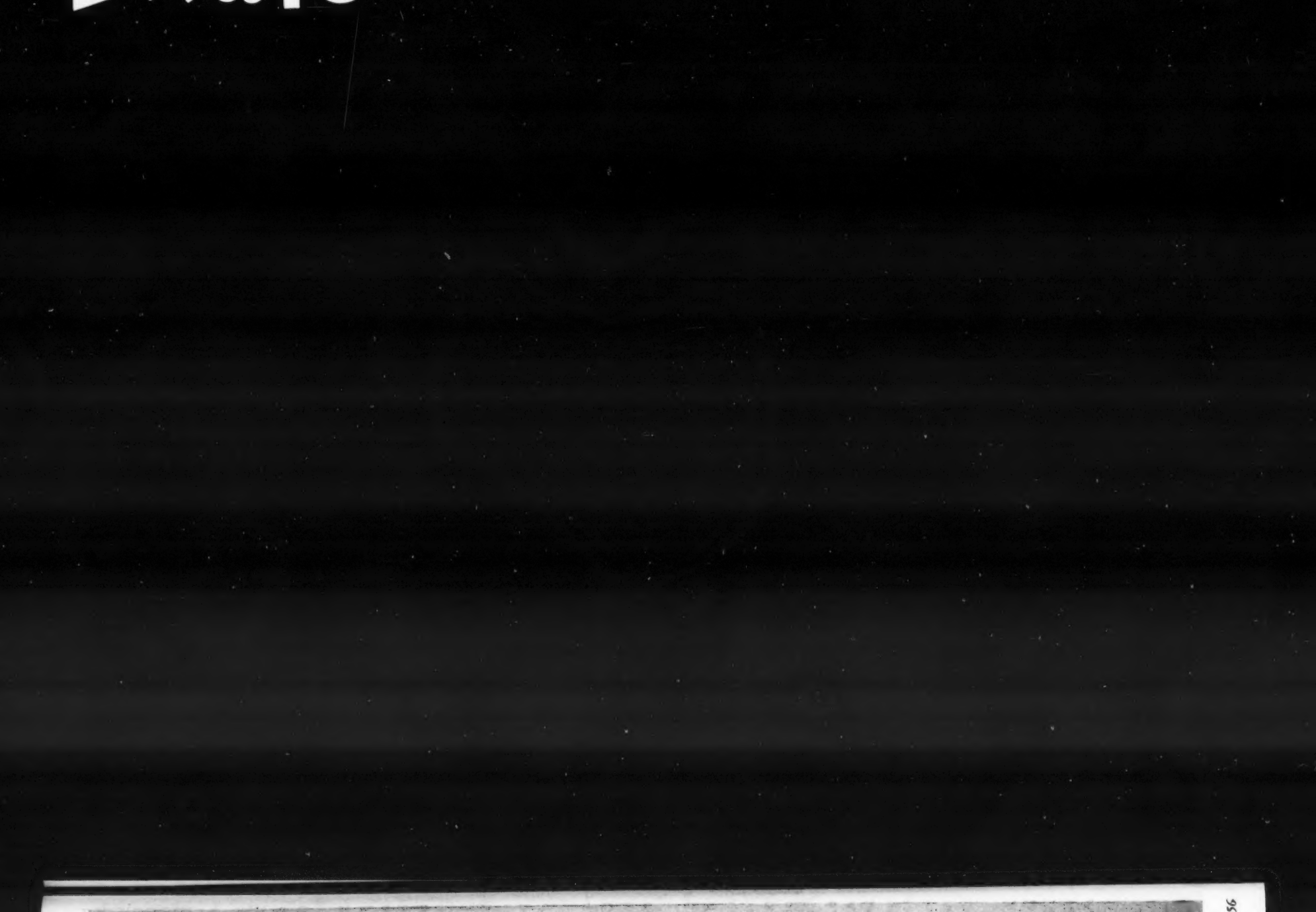

Model DA Langston Slitter & Winder has 2-way control of roll density

The rider roll on this high-speed Langston Slitter & Winder does more than merely provide pressure. Extra tensioning effect can be added simply by adjusting a friction clutch between the rider roll and the overspeed drive. This adjustment is variable according to the needs of the particular paper being wound.

Tensioning effected by the overspeed of the rear main drum is adjustable by varying the pitch of the sheaves on the drive side of the machine. This adjustment provides simultaneous control over the speed of the drive to the rider roll. Tension can be further controlled within close limits by any of a variety of different braking systems on the unwind stand.

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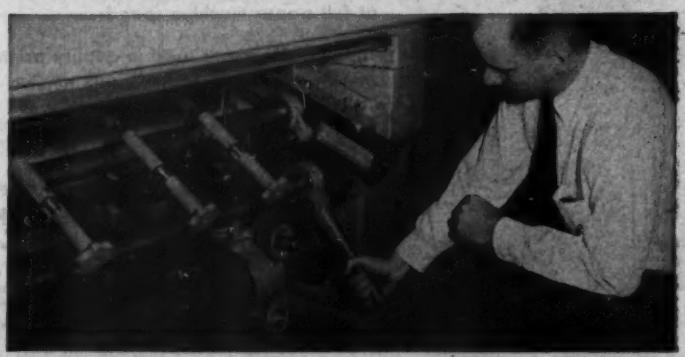

Reverse winding is optional and available on all Langston Slitters & Winders, Models B, C and D. Photo shows man raising lever to set spreader bar on Model DA machine for reverse winding.

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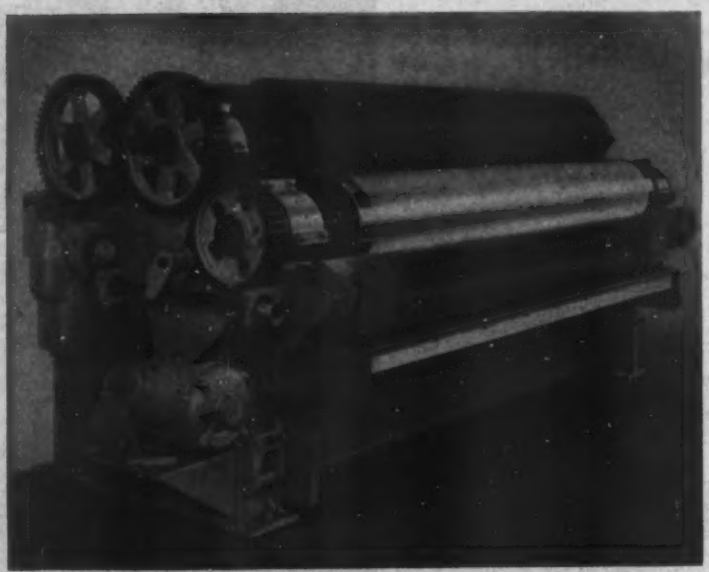

Designed for use in paper machine groups, the Offset Gravure Print Coater, clay-coats paper and paperboard at full paper machine speeds.

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FOREIGN ABSTRACTS

Control of pitch troubles

The addition of both alkali and aluminum sulfate is being used to control pitch troubles in pine groundwood mills, and the present study involves both mechanical pine pulp and unbleached spruce sulfite pulp. In no case were these pulps dried. The deposition of resin on a copper stirrer (Figure 1) stirring at a definite

Fig. 1

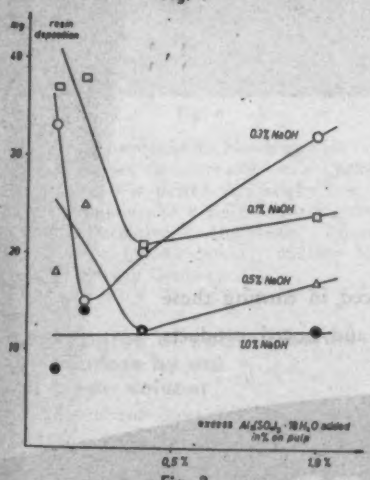


Fig. 2

speed, and a wool felt surface inserted into the pulp suspensions was studied at a pulp consistency of 4 to 4.5 per cent, at 15° C., over 4-hour periods.

Varying ratios of alum to caustic soda were used, usually in comparison with blank tests in which no chemicals had been added to the pulp suspensions. The wool surfaces were used in the form of felt bags stretched over glass baffles and the amount of resin taken up by these was determined by chloroform extraction. In the case of the carefully cleaned copper propeller, the resin pick-up was determined by direct weighing of the stirrer before and after the experiment. Ordinarily the wool took up most of the resin, and the deposit on the copper was slight.

Using four levels of caustic soda concentration, varying from 0.1 to 1 per cent, and by varying the excess of alum (beyond that required for aluminum hydroxide formation), it was possible to show marked differences in total resin deposition. This is shown in Figure 2. The optimum alum excess was 0.2 to 0.5 per cent based on the dry weight of pulp in the suspension. In general, the higher the concentration of sodium hydroxide, the lower was the resin deposition. Too great an excess of alum was unfavorable in its action, and more resin was thrown out of solution and deposited. Control experiments in which no chemicals were added always gave the highest resin deposits. When caustic soda and alum are used, the auxiliary use of polyphosphates is detrimental. Not only do they decrease the activities of the aluminum ions in the mixture, but they serve to reverse the positive charge of the resin dispersions. The mechanisms involved in lowering resin deposition is discussed fully.

Mill variable and certain mill operational recommendations are made, such as the introduction of the chemicals used to avoid high resin separation, at points of high consistency; the importance of adding caustic soda prior to addition of alum, etc.

The deposition of resin from treated and untreated white waters was also studied. Inasmuch as quadrivalent cations have a higher stabilizing effect than has aluminum ion, zirconium sulfate is suggested as being of possible technical interest. Tertiary and quaternary amines could also be considered.

Thirteen references, 2 tables and 5 figures are given. Ernst Back. *Svensk Papperstidn.* 59, 319-25 (1956) (in English).

Hydraulic measurements in the headbox design and operation

Selected data are presented from a series of measurements in headboxes, with a view towards showing the usefulness of hydraulic studies in practical papermachine operation, as well as in research and design work.

Three new instruments were developed for this purpose. They are (1) a continuous recording electronic flowmeter (cf. Figures 3 and 4), (2) a remote control Pilot tube, and (3) a "Crescent tube", which depends on the depression of a thin diaphragm moving a variable, very small differential transformer.

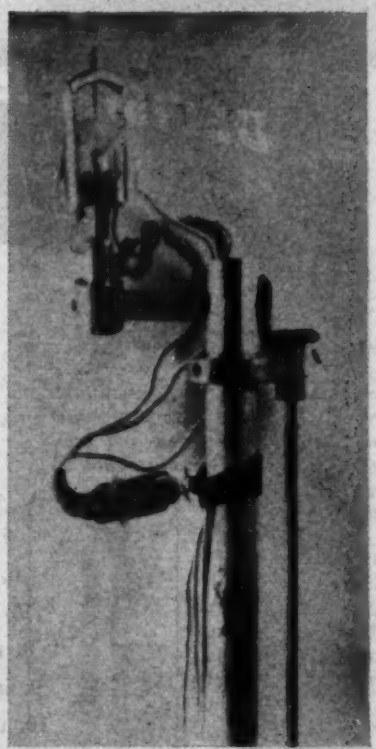
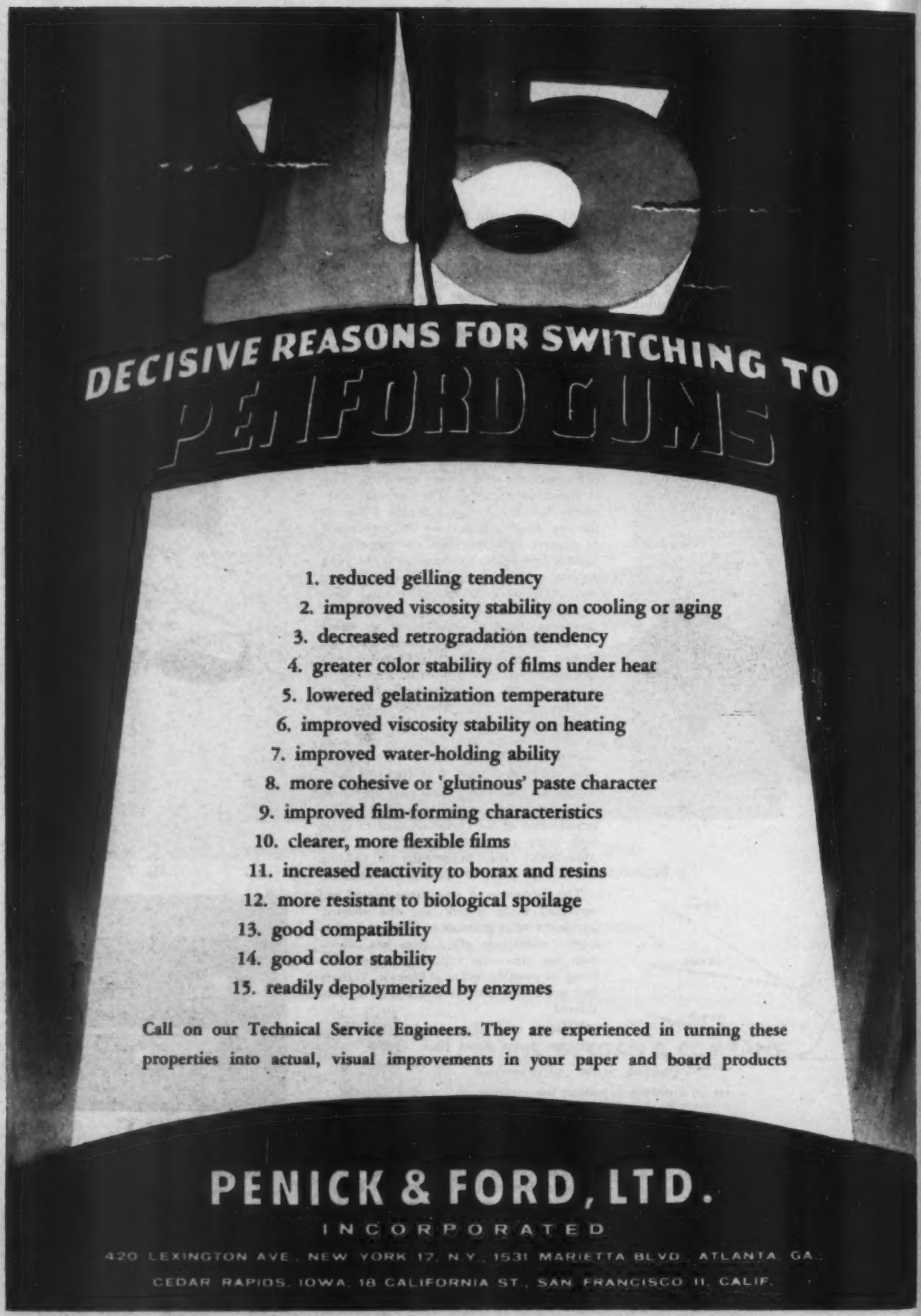


Fig. 3

Fig. 4

Typical recordings are shown, and the importance of such measurements in permitting simple but effective changes in the headbox are discussed at some length. The measurements may lead to remedying faults when the papermachine speed is increased, and also serve to prevent ill-judged alterations. Other methods for evaluating headbox and slice performance (e.g. Betameter profiles) are also mentioned. An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appendix gives a further description of the Northeastern continuous recording electronic flowmeter.

Thirteen references and about 32 figures are included. J. Mardon, G. O'Blenes, and J. A. Ryan. *Svensk Papperstidn.* 59, No. 12, 429-440 (1956) (in English).

Present status of the technology of mechanical pulping

The author gives a comprehensive, well-illustrated report dealing with: transport of logs to the debarking area, various modern types of grinders (illustrated by the figure 5, showing a single-motor electrically controled grinder), power consumption, stock density, grinding pressure, screens, refiners shown in Figure 6),

Fig. 5

Fig. 6

thickening operations, bleaching, use of various types of save-alls, etc. Chemigroundwood is treated very briefly.

Five figures and 8 references are given. E. Deutschmann. Allgemeine Papier-Rundschau (1956) No 12, 632-40; No 13, 712-16 (in German).

The degree of polymerization of cellulose by use of a new solvent

The solvent contains a sodium ferric tartrate complex $[(C_4H_3O_6)_3Fe]$ Na_6 which readily forms a soluble cellulose complex. The composition of the solvent is described, and carefully fluffed air-dried pulps were added to 100 cc of the solution in such amounts that their relative viscosities ranged from 1.2 to 1.5. The mixtures were shaken mechanically until complete solution occurred (at 20 deg. C); normally this required about 15 to 60 minutes in the case of wood pulps and 3 hours for cotton linters. Any undissolved fibers could be seen easily by holding the mixtures to the light.

An important asset in measuring the viscosities of these solutions is the fact that they are insensitive to air (or even to pure oxygen), so viscosities at 20°, could be taken either soon after complete solution, or after several days, without significant change. From these viscosities the degree of polymerization could be computed from the equation: D.P. $= (\eta_{sp} - \eta_{sp}.0.24)/9.25 \times 10^{-4}$.

A large range of pulps was studied—14 in all-and their D.P.s varied from 239 to 1915. Often quadruplicate determinations were made. In general, the reproducibility was very good. The D.P.s of these same pulps had also been determined by the method of Jayme and Wellm, and in a few instances by the usual cuprammonium hydroxide technique. Usually these results were in satisfactory agreement with those obtained with the newer solvent, but there were some divergences—especially when small amounts if lignin were still present in the pulps. The new method requires further study, but looks promising at present. Besides its great insensitivity to oxygen, and the relative ease of making up large amounts of reagent, the solutions are odorless and transparent.

Two figures, 3 tables, and 5 references are given. Georg Jayme and Werner Bergmann. *Das Papier* 10, 307-12 (1956) (in German, with brief English summary).

Durability of paper machine wires

The life of wires is affected mainly by wear and tear and by the tensions occurring in the warp threads. After studying such tensions, the author arrives at a scheme of "total static tensions". The dynamic nature and importance of tensions are also discussed.

After examining the factors causing wear on the machine, the author takes up the causes that necessitate changes of wires. The material in the warp threads must be chosen carefully and specifically for the type of machine in which it will be used. A suitable basis for selecting a wire, the author believes, may be the Kilowatt hours to be expended during the wire life on the machine. Ten references and 13 figures are included. Olavi Häkkinen. *Paper and Timber* (Finland) *Special No* 4a, 197-205 (1956) (in Finnish with a brief English summary).

"Hornification" of pulps

The irreversible hornification of dried pulps was studied with the help of the electron microscope. Apparently the microfibrils are bonded to larger aggregates, and this reduces both the internal and the external surface available to water.

In wood, the microfibrils are nearly pure cellulose surrounded by a hemicellulose layer. The system also involves incrustants high in lignin, which inhibit the combination of the microfibrils to thicker strands. Thus another biological function of the lignin layer is recognized—*i.e.* that of

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hindering such combination. When the encrusting materials are removed however, the combination of microfibrils can occur, as for instance in pulping and bleaching.

The formation of bundles and "cords" is aided by swelling and shrinkage, with the concommitant expansion and contraction. These phenomena have a bearing on the differences between sulfite and kraft pulps. The latter show a much greater resistance to beating, and under the electron microscope, this appears to be correlated with a very marked bonding of the microfibrils, reaching into the innermost layers of the cell wall.

Twelve figures and 27 references are given. Georg Jayme and Günther Hunger. *Monatshefte Chemie* 87, 8-23 (1956); through B.I.P.C. 26, 810-11 (1956) (Original in German).

The use of sodium aluminate in paper manufacture

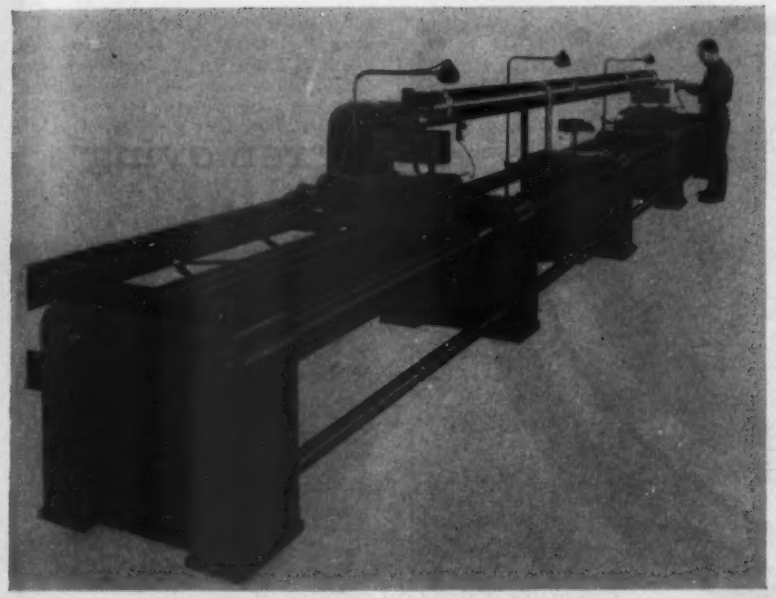
This is an extension of previous work reported in *Das Papier* 9,311 (1955); (cf. *Chemical Abstracts* 49,1523). The authors show the influence exerted on retention when aluminum sulfate and sodium aluminate, either alone or in admixture, were added to pulp suspensions. In the various cases, the total amount of aluminum (calculated as alumina) was kept constant in a specific series. The pulp mixture consisted of 70 per cent groundwood and 30 per cent partially bleached kraft pulps; the suspension used had a consistency of 0.5 per cent, and the initial pH of the mixture (obtained with the tap water of Düsseldorf) was 7.5.

The effects of lowering or of raising the pH and on the retention of alumina were tabulated, together with the diminished pressure (Unterdruck) measured in kg/sq. cm. obtaining during the sheet formation. The retention effects became increasingly dependent on pH as the amounts of alumina introduced into the suspensions increased. Loaded and unloaded suspensions showed only quantitative differences in their retention behavior, but the type of filler used exerted an influence on retention.

In strongly alkaline media, graphs showing retention and those indicating the diminished pressure during sheet formation were no longer similar in their trends. With identical total alumina additions, at definite pHs (especially in a medium pH range), higher retentions were obtained when pure alum or pure sodium aluminate was introduced and the desired pH then reached by suitable addition of sodium hydroxide or sulfuric acid, than when this same pH was achieved by adding suitable mixtures of alum and aluminate. However, in such cases the suspensions contained more sodium ions or sulfate ions than when only the aluminum compounds were employed. In certain instances the retention obtained exceeded 100 per cent of the calculated values. In one instance it reached 121 per cent. This excess remains unexplained, but may be due to inorganic matter sorbed from the tap-water.

Four tables and 13 graphs are included. Theodor Ploetz and Ludwig Scheuring. *Das Papier* 10,183-9 (1956) (in German).

NEW PRODUCTS



These items are numbered for your convenience. Further information on the various products described may be requested at no obligation through our Readers' Service Dept. Use the business reply card in this issue.

11/ Use readers' service card.

Balancing unit

Here to meet general industrial demand for a sensitive balancing machine, is the new model series 500 dynamic balancing unit, manufactured by Raydyne Corp.

This unit will take paper rolls up to 36 ft. between bearing centers, 48 in. diameter, and up to 10,000 lbs. in weight. It will accommodate the usual run of paper rolls such as calender rolls, press rolls, etc. and will also handle other type of rotors found around a paper mill.

Many Raydyne features are incorporated in this unit such as the true seismic free-in-space unbalance indicator attached to work-supporting mountings on chrome balls and raceways which provide over four inches of free amplitude travel.

As a safety feature, the unit is equipped with a wide range variable speed drive which the operator can correct large amounts of unbalance at low, safe speeds.

The unit carries a complete push-button control panel. The panel provides control of all motors, speed, belt tension and indicating apparatus. *Raydyne Corp.*

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New homogenizer

A new piece of homogenizing equipment is being imported and introduced to the American pulp & paper industry for improving dispersions of gums, starches, chemicals, pigments and various other chemical additives.

At 3600 rpm. this unit will process from 150 to 350 gal. per hour. It is particularly suited to homogenizing viscous materials where accelerated hydration can benefit an operation. Because of its design, cold water soluble gums and pigments can be instantly homogenized and fed as a complete solution into beater, head box or any other station.

Combining the function of homogenizer and pump, materials can be either fed directly into any of the stages of pulp-paper operations or pumped into tanks for storage or recycling. *Buschman Products.*

13/ Use readers' service card.

Automatic wire repair welder

This new Swedish, automatic wire repair welder will be introduced to the United States this year.

This automatic welder, known as the "Siebflick" is designed to repair fourdrinier wires with speed, improved finished results and with a great reduction in cost over present methods.

It is now used in over half of the English paper industry.

Because of special requests from paper mills in this country, men from Wiretrans Inc. will begin in October to tour our mills to give demonstrations of this welder. All demonstration visits will be handled by request. Your request can be handled through our readers service card program. *Wiretrans Inc.*

14/ Use readers' service card.

Anti-skid coating

Anti-skid coating, Resyn 32-3415, has overcome stacking problems caused by the slickness of the new finishes.

The coating dries almost instantaneously in an invisible film. It provides an excellent non-skid surface, and cases treated with this material may be transported and stored without slipping from place. *National Adhesives.*

15/ Use readers' service card.

Void detector

The void detector is a recently developed electrical instrument designed for the detection of minute or large holes in any material which is electrically non-conducting.

The standard model tests materials such as paper, plastic and rubber up to .025 in. thick and records holes of 1/64 in. in diameter and larger.

The detecting and recording system includes the use of a one-, two- or three-position indicator unit connected electrically to feeler brushes.

The two- and three-position instruments are said to not only record all holes and count them, but to indicate the sections in which the holes appear. *Viking Instruments Inc.*

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Aqueous dispersion

Known as Witco paste #253, this chemical product is an aqueous dispersion developed specifically for use by the paper industry in the production of machine

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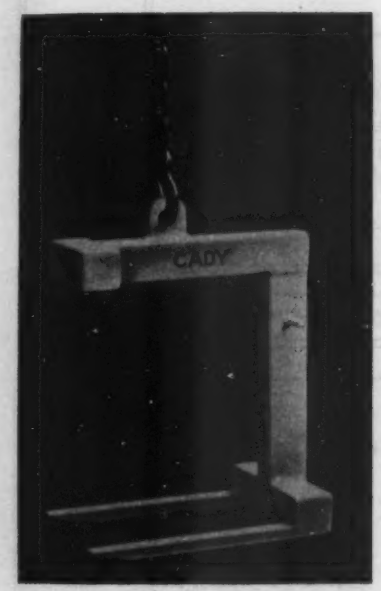
The ultrafine particle size of the solids and the carefully selected surface active agents contained in paste #253, insure corresponding improvements in the coating itself. These are maximum gloss, maximum brightness, effective plasticizing, and excellent water repellency. *Witco Chemical Co.*



17/ Use readers' service card.

Pallet lifter

This new crane attachment for transporting palletized materials under existing craneways is called the caddy pallet lifter. It is adaptable to moving pallet and skid loads between floor levels in plants or across areas where truck aisles do not exist.

Made from alloy steel, the lifters are available in capacities from one ton up. Models with adjustable forks, or custom built lifters are available upon request. *Cady Metal Fabricating Co.*

18/ Use readers' service card.

Self-lubricated plug valve

The first self-lubricated plug valve to be injection molded of polyvinyl chloride is now on the market. It is designed to handle corrosive fluids more efficiently then conventional valves.

Other important features are a straight through port that makes possible unimpeded flow conditions; adjustments to compensate for wear, positive closing, and self-indicating port positions. A nub on the bottom can be tapped for insertion of a drain plug if desired. The valve is furnished with threaded ends, or with socket type ends for solvent welding. *Tube Turns Plastics, Inc.*

19/ Use readers' service card.

Dispersion mills

Arrangements with a British engineering firm have been made to introduce in America, their new development in ball mills.

In these new mills, four individual pots are arranged on the periphery of a circle that revolves around a central drive, while each pot also rotates simultaneously on its own driving spindle. This results in a multiplied mixing action. Also, because the pots are interchangeable, the producer may make four different coating formulations at one time.

These mills work well with all types of coating formulations. They will grind to semi-paste consistencies or will grind dry materials. *The Kinetic Dispersion Corp.*

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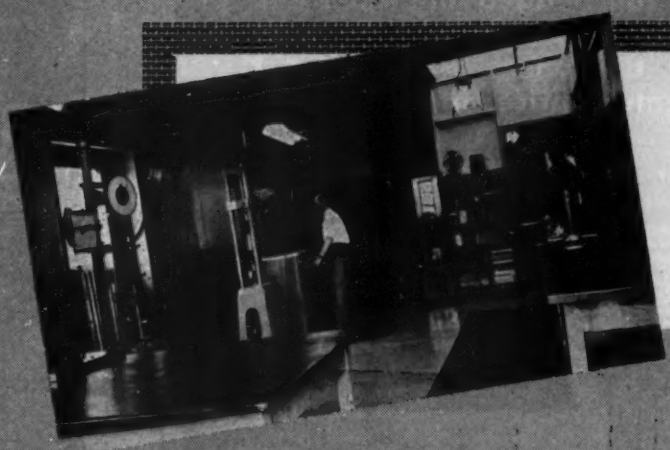
Industrial roof ventilator

Airfoil fan blades welded to a specially designed hub insure maximum exhaust of heat, smoke, dust, and fumes at low rpms, according to the company. The ventilator

"From ingot to fourdrinier wire"



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Jet Axial ventilators can be furnished with a fusible link device which acts as an emergency damper opener during fires. Exposed to intense heat, the link breaks allowing the dampers to open and smoke and heat to escape. *Detroit Blower Co.*

21/ Use readers' service card.

"Push-to-test" lamp

When control circuit trouble is suspected, a new "push-to-test" oil-tight indicating light permits the machine operator, or maintenance man to check whether an unlit indicator lamp is an indication of trouble or merely the result of a lamp failure.

By pressing the lens of the new indicator light, the operator transfers the lamp from its normal circuit to a separate built-in lamp test circuit. If the lamp is functioning, it will light normally to indicate that trouble shooting is in order. If it fails to light, replacement of the lamp is possible without appreciable expenditure of time by maintenance personnel. *Westinghouse Corp.*

22/ Use readers' service card.

Digital flow rate indicator

A new direct-reading digital indicator designed primarily for use with turbine flowmeters. The new unit features a completely digital system, operating from the frequency output of the turbine meter, which takes full advantage of the remarkable linearity and repeatability inherent in the turbine meter primary. Inch-high numbers, which provide visual readout up to 25 ft. away, is one of its features. It also features a manual correction for specific gravity. Giving direct reading of flow, the operator is completely relieved of computation. *Fischer & Porter Co.*

23/ Use readers' service card.

Drain or sampling valve

No. 23 drain or sampling valve, originally available in ¾ in. and 1 in. size, is also available in standard sizes of 1¼ in., 1½ in., and 2 in. N.P.T.

Designed for severe operating conditions, the valve has the feature of outside screw and yoke construction for high temperature or corrosive operations where inside threads cannot be tolerated. The outside thread design eliminates possible freezing and allows the valve stem to work freely at all times.

It is also ideal for installations where it is desirable to have the valve seat inside the wall of a vessel to prevent liquid from remaining in the nipple and valve. *Jerguson Gage & Valve Co.*

24/ Use readers' service card.

Liquid level gage

The new red flasher truscale gives a positive visual warning which immediately

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signals if there is trouble in the boiler water. The face of the scale lights up and flashes red continuously to warn when the liquid level is too high or too low.

In addition to being easy to see and read, they may be equipped with signal horns, lights and up to six repeaters, so they can speak up and signal the whole operating floor as well as officials at other remote points. *Ferguson Gage & Valve Co.*

25/ Use readers' service card.

New resin and coating modifier

A new resin and coating modifier called "Pamak" has been announced.

Produced in the latest type of multi-column fractional distillation equipment, Pamak tall oil fatty acids are designed to meet specific requirements for uniform high quality. *Hercules Powder Co.*

26/ Use readers' service card.

Electronic weighing

A new conception in fast, accurate weighing and weigh batching is here. Employing electronic load cells, a complete line of weighing instruments has been developed that assures accuracy, faster weighing, plus the convenience of remote weight indication.

Recording instruments may be located as much as 250 ft. from the scale platform.

Complete literature is available on the complete line of instruments. *Fairbanks-Morse.*

27/ Use readers' service card.

Rag cutters

New features in the design of its rag cutters have been announced by Taylor, Stiles & Co.

The single-feed roll of the 517 and 520 cutters is no larger and heavier and is mounted on pivoted arms. This roll holds rags by its own weight—not by pressure springs.

The end plates of the feed roll incline inward to overcome tendency of rags to disperse outward. This feature, together with enlarged space between the cutting element and the frame, prevents jamming between the cutting element and frame. *Taylor, Stiles & Co.*

28/ Use readers' service card.

Solenoid valve

A new high pressure, heavy fuel oil, pilot operated solenoid valve has been made available.

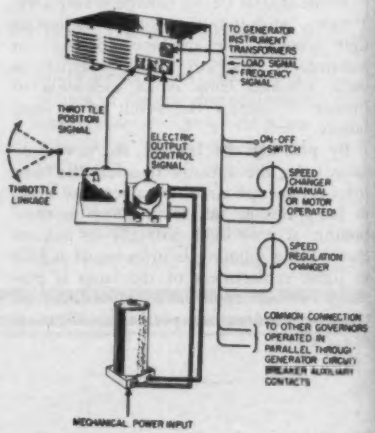
This packless, two way bronze body valve has a full ¾ in. port and a pressure range of 15 to 300 psi. It handles heavy fuels up to 200°F. The valve is normally closed, that is, it closes when the solenoid is de-energized and opens when the solenoid is energized. This valve is approved by the Association Factory Mutual Fire Insurance Co.'s. *Automatic Switch Co.*

29/ Use readers' service card.

High-speed slitter rewinder

A new high-speed slitter rewinder has been designed and is now being made available to converters. It has a driven pivoted rider roll and a rewind shaft lifting and control arrangement. It also has air loaded score slitters and adjustable web spreaders.

With speeds up to 1500 ft. per minute, the rewinder is designed to handle a 52 in. web. *Paper Converting Machine Co.*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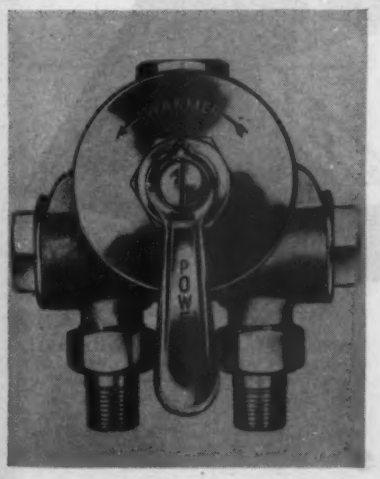
of the new governor to anticipate change in prime mover speed, and to respond extremely rapidly, permits highly accurate speed (frequency) regulation. *Westinghouse Corp.*

31/ Use readers' service card.

High-head differential meter

High-pressure high-velocity flows may now be measured and transmitted pneumatically on a linear flow basis. A new line of high-head differential pressure transmitters, utilizing the accuracy of mercury U-tube measurements, automatically converts a differential pressure to rate of flow—for improved metering and control practices. Features are low cost, accuracy, rangeability, simplicity, and flexibility. *Bailey Meter Co.*



32/ Use readers' service card.

Mixing valve

Cold water and steam can be automatically mixed to provide hot water at any desired temperature by a unique mixing control called the style D mixer. The control can be used to obtain hot water where only cold water and steam are available, or to superheat plant hot water for a processing application.

The mixer takes steam and cold water at pressures from 10 to 100 lbs. Turning only one handle regulates the temperature of the discharged hot water at any point from that of the incoming water to 200 F., regardless of pressure changes in supply lines. A pressure equalizing valve controls and equalizes the pressure of steam and water before they enter the mixing chamber. The mixer is available in ½-in. and ¾-in. sizes. *Powers Regulator Co.*

33/ Use readers' service card.

Belt hook

A new, larger belt hook for use with belts ⅜ in. thick, but not over 13/32 in. thick, features a double-staggered grip to provide even distribution of hook-point pull on the belt. Tests have already shown that these hooks easily withstand pulls up to 125 pds. per hook. *Clipper Belt Lacer Co.*

34/ Use readers' service card.

Non-flammable hydrazine

A new completely non-flammable form of hydrazine for deoxygenation of boiler feedwater is called Scav-Ox. The product is 35 per cent solution of hydrazine in water. It has no flash point and no fire point, yet retains all the advantages of hydrazine as an oxygen scavenger and corrosion inhibitor. Scav-Ox eliminates precautious handling of hydrazine and is supplied in lighter weight, easier-to-handle containers. *Olin Mathieson Chemical Corp.*

35/ Use readers' service card.

Plastic adhesive

Rubbatex, a flexible plastic adhesive which will not crystallize, is developed for the manufacture of combination polyethylene and paper bags.

This adhesive works in combination machines for seaming polyethylene and paper in the fabrication of flat and gusset bags with side seams and envelop style bags with side seams. It is also used for producing seams in the manufacture of duplex bags from polyethylene coated paper. Ordinary glues and adhesives will not adhere to polyethylene. *Rubba, Inc.*

36/ Use readers' service card.

Acrylic thickener

The use of high-solids acrylic thickener and dispersant for aqueous systems is expected to find a wide variety of applications in the manufacture of adhesives, textile backings, as a thickener for coating resins in paper manufacturing. *Rohm & Haas Co.*

Forming Properties?

Alberta Hi-Brite

see Page 447

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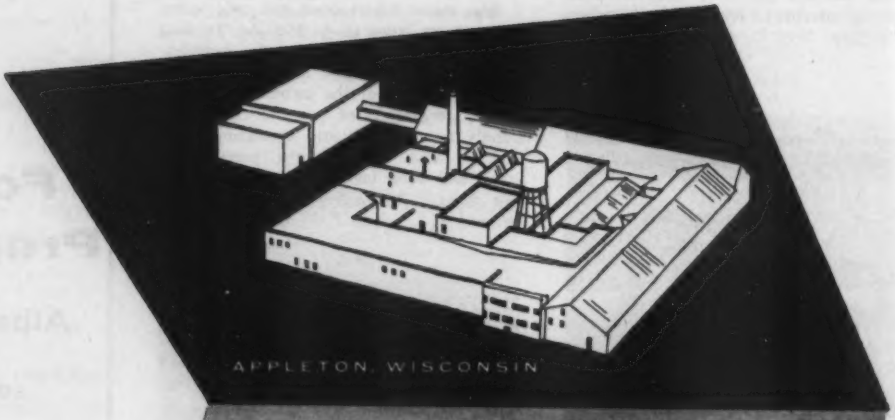

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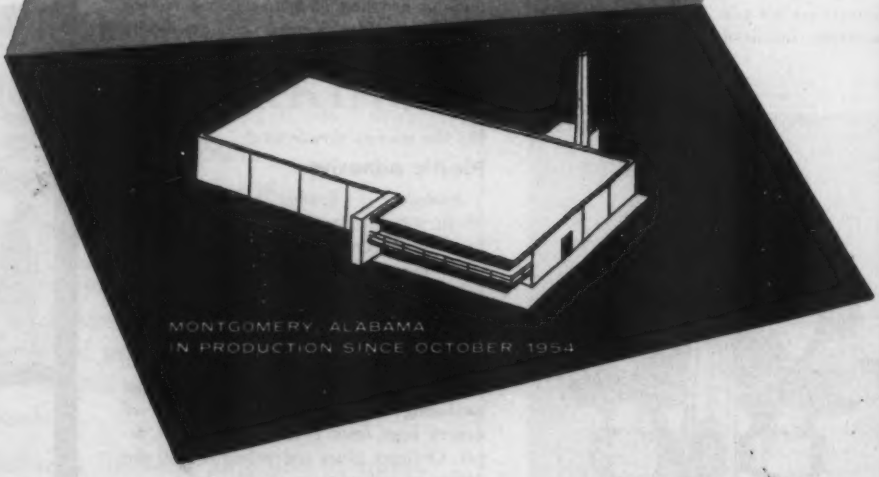

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Books

ECONOMIC GEOGRAPHY OF INDUSTRIAL MATERIALS. Edited by Albert S. Carlson. Reinhold Publishing Corp. New York, N.Y. 7 x 10½. 494 pages. $12.50.

Industrial management will find this book useful as a means of studying its product, process and location attributes in the light of current and future economic situations in its locality, the country and the world. Maps, tables, charts and statistics supplement the discussions of economic-geographic conditions necessary for profitable production.

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An extensive index will facilitate reference.

Manufacturers' Publications

These items are numbered for your convenience. Copies of the publications may be requested at no obligation through our Readers' Service Dept. Use the handy business reply card which accompanies this issue.

37/ Use readers' service card.
The Dorrco Monorake. Dorr-Oliver Inc. This bulletin describes the design, types and sizes, operation and advantages of this mechanism for cleaning rectangular sedimentation basins.

38/ Use readers' service card.
Magamp Sectional Drive for Paper Machines. Westinghouse Electric Corp. A bulletin describing the company's sectional drive units. It gives detailed information on the features of these units. Photographs and diagrams are also included.

39/ Use readers' service card.
Liquid Measurements in Pounds. The Liquidometer Corp. A 16-page booklet containing the description and uses of the liquidensitometer. The liquidensitometer is unit to measure liquids by means of an electric hydrometer. Measurements of liquids during transfer or while in a tank, can be made on a weight basis rather than in terms of gallons.

40/ Use readers' service card.
Acrysol ASE-60. Rohm & Haas Co. A detailed technical data giving information on Acrysol ASE-60, the second in a series of alkali-soluble polymers. Acrysol ASE-60 is useful for viscosity adjustment of emulsion and latex compounds of many types.

41/ Use readers' service card.
Chemicals for the industry. Olin Mathieson Chemical Corp. A new 20-page booklet describing briefly the complete line of chemicals for the industry. The booklet covers organic, inorganic and specialty chemicals, listing characteristics, grades, containers and producing points for each. Principal uses are given for organic chemicals and specialties.

42/ Use readers' service card.
Industrial Heating Units and Devices. General Electric Co. A revised catalog that describes electrical heating units and devices which are available from the Westinghouse Corp. It contains information and design selection charts on: strip heaters, natural and forced convection air heaters, immersion heaters etc. Information about selection of many special types is also included.

43/ Use readers' service card.
Pulpwood Industry Facts. American Forest Products Industries Inc. Latest facts about the industry are contained in this 12-page illustrated booklet. The booklet discusses the entensive and progressive programs of forestry and the demand for pulpwood in the industry.

44/ Use readers' service card.
Bulletin of The Institute of Paper Chemistry. The Institute of Paper Chemistry. The June 1956 issue of the Bulletin from the Institute of Paper Chemistry compiled by Edith Stroschneider. The bulletin includes library notes and references on helpful aids to the paper industry.

45/ Use readers' service card.
Polyethylene Processing tips. U. S. Industrial Chemicals Co. A handy file folder of U. S. I. polyethylene processing tips which is prepared to answer questions pertaining to the various types of polyethylene — their uses, operating conditions and what types are available. Future issues of these tips will be prepared to keep the file folders up to date.

46/ Use readers' service card.
Mill Practices in the Inventory of Waste Paper. Frank Block Associates. The first booklet ever written on waste paper inventory and is based on a survey among consuming mills in the Midwest. This 24-page booklet gives reports on actual practices that are found worthwhile by leading mills. It gives practices on inside and outside storage, mechanized handling, inventory costs and controls.

47/ Use readers' service card.
How to Install Johns-Manville Transite Pressure Pipe for Overhead industrial water and process lines. Johns-Manville. This 48-page guide book is divided into 15 sections and covers such items as: hanging and supporting the pipe, bracing for thrusts, the poured flange coupling and the Roto-Split flange coupling. It also includes diagrams of typical transite systems for overhead lines.

48/ Use readers' service card.
Pumps. Layne & Bowler Inc. A completely informative bulletin which not only covers Layne water well systems, but such subjects as Layne oil and water lubricated vertical turbine pumps, special water well drilling, service work, shutter screens, irrigation wells and pumps, water and well treatment for rehabilitating water sources and other phases of water development for industry and municipalities.

49/ Use readers' service card.
"An Open Door". Swenson Evaporator Co. It tells in a 12-page brochure about unit operations such as: evaporation, crystallization, filtration, pulp washing and spray drying, as a means to reduced costs and improved quality for process industries. It gives information on the research, testing and engineering employed to assure desired results, and describes the Swenson services available from consultation through design and service.

50/ Use readers' service card.
"The Dorr Continuous Recausticizing System." Dorr-Oliver Inc. This bulletin describes the operations, equipment units and advantages of D-O's continuous recausticizing system for the alkaline pulping process. Also included, are a typical flowsheet, photographs and drawings of the system and each of its components as well as photographs of typical installations.

51/ Use readers' service card.
Seamlex Bronze Hose. Seamlex Co. A four-page bulletin gives essential information on Seamlex bronze hose. Illustrations show cross-sections of hose and fittings. Tables give pertinent technical data. Tabulated service classification serves as aid to writing hose specifications.

52/ Use readers' service card.
Safety Chart. Allied Chemical & Dye Corp. A specially prepared wall chart that clearly and concisely outlines the safety rules to be followed in handling of hydrogen peroxide is issued free by the company.

53/ Use readers' service card.
Adhesives. Morningstar-Paisley. A booklet showing how wide is the range of starches and flours, dextrins, water soluble gums and polyvinyl acetate emulsions now available to the formulating chemist. It gives a good perspective of the rapidly developing field of liquid adhesives for both packaging and manufacturing.

54/ Use readers' service card.
Industrial Rotating Hydraulic Drives. The Oilgear Co. This bulletin is a reprint of a talk given by Milton G. Malmquist of Minnesota Mining & Manufacturing. One of Oilgear's latest "Hytac" precision drive systems is also described and illustrated to show new developments in a synchronized tandem drive that has solved problems presented in Malmquist's talk on automation.

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Specifications for Non-Shrink Grout. The Master Builders Co. Copies of specifications for the non-shrink grouting of heavy equipment, anchor bolts, building columns, and bridge seats with pre-mixed grout are available free of charge. Also, from the same source, is a functional specification for pre-mixed, non-shrink grout.

56/ Use readers' service card.
How To Use Scav-Ox. Olin Mathieson Chemical Corp. A bulletin describing how to use and handle Scav-Ox. Scav-Ox is a new, completely non-flammable form of hydrazine for deoxygenation of boiler feedwater.

57/ Use readers' service card.
Typical Analyses of Edgar Paper Coating and Filling Clays. Minerals & Chemicals Corp. of America. As an informative aid to clay selection and evaluation, this bulletin contains full specifications and basic properties of seven coating clays and four filler clays.

58/ Use readers' service card.
Belt Idler. Joy Mfg. Co. A 12-page booklet containing design and application data for those who select, specify, purchase and use belt conveyors to handle bulk materials. Included are descriptions, dimensional drawings, specification tables and suggested applications for idlers

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and various troughing, impact, training and return brackets to use with belt widths of 18 through 72 in.

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Motor Catalog. Marathon Electric Mfg. Corp. The only available complete cross reference between old and new NEMA ratings, both horsepower and dimensions. Covers current pricing for 1/20 through 1000 hp motor sizes on both fractional and integral hp motors. Includes adapter basis and prices from old to new NEMA frame mountings. Complete with popular standard motor modifications.

60/ Use readers' service card.

Welding Data Book. Eutectic Welding Alloys Corp. A 140-page pocket data book featuring simplified welding procedures for every base metal. The book, free of cost, is a guide to improve torch and metallic arc welding, brazing and soldering. "How-to-weld" information is given for fabrication, maintenance repair and salvage, overlaying for wear and corrosion resistance, and welding of dirty, rusted parts.

61/ Use readers' service card.

Chemicals for the Paper and Pulp Industry. Nopco Chemical Co. A booklet describing the complete line of Nopco's specialties for the pulp and paper industry.

62/ Use readers' service card.

Oliver Brownstock Washing System. Dorr-Oliver Inc. A 12-page bulletin describing the distinguishing features, operation, components, sizes, adaptations and advantages of this Brownstock washing system. Also included are typical flowsheets and photographs of the system and each of its components.

63/ Use readers' service card.

Teflon. Crane Packing Co. A 12-page brochure on Teflon and Teflon products. The products include: mechanical and hydraulic packings; sheet, rod, tubing and tape; flexible bellows and gaskets; custom molded and machined parts and electrical and electronic parts and insulation.

64/ Use readers' service card.

The Dorrco Clariflocculator. Dorr-Oliver Inc. A 12-page bulletin describing the physical characteristics, principle of operation, types, sizes and advantages of this combination flocculation and clarification mechanism. Included, are photographs of operating installations and drawings of standard units.

65/ Use readers' service card.

Standard Centrifugal Process Pumps. Dean Bros. Pumps Inc. A booklet giving a complete description of the company's centrifugal process pumps. Parts are also listed.

66/ Use readers' service card.

Deaeration—Why?—How? Cochrane Corp. This leaflet explains in capsule form the fundamentals of deaeration and why it is so necessary in water conditioning. The principles of operation as well as the advantages and application of the various methods of deaeration are discussed.

67/ Use readers' service card.

Process Equipment. Dravo Corp. A brochure describing the large-scale and special purpose process equipment for the chemical, textile, plastic, rubber and allied industries. Design and construction details are given for intensive and other types of process equipment.

68/ Use readers' service card.

Overhead Cranes. Chicago Tramrail Corp. Catalog containing the complete line of underhung, overhead cranes with a broad range of applications illustrated and described.

69/ Use readers' service card.

Flowmeter. Fischer & Porter. A new catalog describing the company's line of high-capacity, variable-area flowmeters. These meters are specially designed for those high-capacity services where the advantages of linear flow output, wide range, and freedom from piping limitations are required.

70/ Use readers' service card.

CRV Pump. Ingersoll-Rand. A new bulletin which covers the complete line of class CRV cradle-mounted centrifugal pumps. The various models are described and their applications listed on individual pages of the bulletin. Typical installation views of the models are shown. Performance tables and dimensions for the entire line are shown.

71/ Use readers' service card.

Tubes. Babcock & Wilcox Co. Anyone involved with condensers and heat exchangers will benefit from this 6-page folder which emphasizes the quality, dependability and economy of electric resistance welded carbon steel tubing in applications involving heat transfer. A chart outlining the hydrostatic test pressures required for various sizes of the tubes is also shown.

Flexibility?

Alberta Hi-Brite

see Page 447

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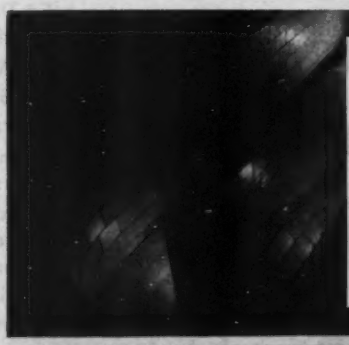

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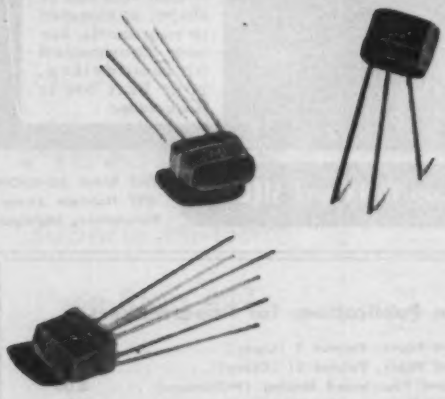

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Sulphur Producing Units
- Newgulf, Texas
- Moss Bluff, Texas
- Spindletop, Texas
- Worland, Wyoming

MARKET QUOTATIONS

RAGS (Domestic)

New Cotton Cuttings

The following are brokers' and large dealers' average buying prices for sizeable lots in cents per pound f.o.b. New York:

	per cwt.	
No. 1 white shirt cuttings	13.50—	14.00
Soft unbleached muslins	15.50—	16.00
Fancy shirt cuttings	4.50—	5.00
No. 1 percales	5.50—	6.00
No. 1 washables	2.25—	2.35
No. 1 light silesias	6.50—	7.00
No. 1 light prints	4.75—	5.00
Light flannelettes	6.50—	7.00
Cottonades	3.00—	3.50
Blue overall cuttings	7.00—	7.50
Blue cheviots	7.00—	7.50
Canton flannels, bleached	10.50—	11.00
Canton flannels, unbleached	10.50—	11.00
Osnaburg cuttings	9.50—	10.50
Underwear cuts, bleached	14.50—	15.00
Underwear cuts, unbleached	14.50—	15.00
Sun tan khaki cuttings	5.25—	5.75
American linen cuttings	6.75—	7.25

Cotton Rags

The following are prices, cents per pound, paid by dealers and brokers f.o.b. New York:

	per cwt.	
No. 1 roofing (Chicago)	1.20—	1.25
No. 2 roofing (Chicago)	.80—	.85
Twos and blues, repacked	2.00—	2.25
Thirds and blues, repacked		
No. 1 whites, repacked		
No. 1 whites, miscellaneous		
No. 2 whites, repacked		
No. 2 whites, miscellaneous		

RAGS (Foreign)

(ex dock New York City)

New Rags

	per cwt.
New dark cuttings	Nominal
New mixed cuttings	
New light silesias	
Light flannelettes	
Unbleached cuttings	
New white cuttings	
New light oxfords	
New light prints	

Old Rags

	per cwt.
No. 1 white linens	Nominal
No. 2 white linens	
No. 3 white linens	
No. 4 white linens	
No. 1 white cottons	
No. 2 white cottons	
No. 3 white cottons	
No. 4 white cottons	
Extra light prints	
Ordinary light prints	
Medium light prints	
Dutch blue cottons	
French blue cottons	
French blue linens	
Checks and blues	
Linsey garments	
Dark cottons	
Old shopperies	

ROPE and BAGGING

F.o.b. and ex dock New York City

Gunny No. 1, domestic	4.75—	5.25
Gunny No. 1, foreign	4.75—	5.25
No. 1 manila rope, domestic	7.75—	8.25
No. 1 manila rope, foreign	6.25—	6.50
New burlap cuts	5.50—	6.00
Sisal strings	4.25—	4.50
Mixed strings	1.50—	1.75

WASTE PAPER

The following are prices, dollars per net ton, paid by brokers and large dealers for carload quantities of baled stock, f.o.b. cars New York:

No. 1 hard white envelope cuttings	105.00—	115.00
No. 1 hard white shavings	85.00—	90.00
No. 1 soft white shavings	55.00—	60.00
Soft white shavings, uncoated	60.00—	70.00
Fly leaf shavings No. 1	28.00—	33.00
Fly leaf, woody, No. 1	35.00—	40.00
Mixed colored shavings	18.00—	23.00
No. 1 books and magazines	19.00—	20.00
Ledger stock, white, No. 1	50.00—	55.00
Ledger stock, colored, No. 1 (Midwest ship)	35.00—	40.00
New manila envelope cuttings (free of groundwood)	75.00—	80.00
New manila envelope cuttings (containing groundwood)	55.00—	60.00
Manila tab cards	75.00—	80.00
Colored tab cards	50.00—	60.00
New all-kraft envelope cuttings	70.00—	75.00
Triple sorted kraft, 100%	35.00—	40.00
No. 1 old kraft	30.00—	
White news cuts, No. 1	75.00—	80.00
No. 1 overissue news	18.00—	19.00
Folded news, special	16.00—	17.00
Folded news, ordinary	13.00—	14.00
Old corrugated boxes	20.00—	
New jute corrugated cuts	24.00—	25.00
Mill wrappers	18.00—	20.00
Boxboard cuttings	8.00—	
No. 1 mixed paper	11.00—	

CHEMICALS

F.o.b. New York City

Alum, ammonium		
Granular, bags, works, cwt.	4.30—	
Lump, drums, works, cwt	5.05—	
Powdered, drums, works, cwt	5.20—	
1-Arginine, drums, kilo	74.80—	
Blanc Fixe		
Direct process, bags, c.l., works, ton	110.00—	
L. c. l., works, ton	120.00—	
Bleaching Powder, drums, cwt		
Casein, domestic acid precipitated		
Standard, bags, 10,000-lb. lots or more, shipping point, lb	.32—	Nom.
Premium, bags, 10,000-lb. lots or more, shipping point, lb.	.38—	Nom.
China Clay, domestic dry-ground, airfloat, 99%		
325-mesh, bags, c. l., works, ton	10.00—	
300-mesh, bags, c. l., works, ton	13.50—	14.50
Imported, white, lump, bulk, c. l., ex dock Phila, Portland, Me., gross ton	20.00—	35.00
Chlorine, liquid		
Tanks, single units, works, freight equaled, cwt	3.05—	
Glycerine, refined (CP, USP) 99%, drums, c. l., lb	.31½—	
Litharge, commercial powdered		
Barrels, c. l., works, freight equaled, lb.	.18	—
Rosin, gum, c. l., f.o.b. New York, cwt		
E	9.05—	
F	9.05—	
G	9.05—	
WW	9.20—	
Rosin, wood, c. l., f.o.b., shipping point, cwt.		
K, M	8.05—	
N	8.10—	
WG	8.15—	
WW	8.30—	
Saltcake, domestic, bulk Works, 100% Na_2SO_4 ton	28.00—	
Soda Ash		
Dense, 58%, paper bags, c. l. works, cwt	1.80—	
Light, 58%, paper bags, c. l. works, cwt	1.75—	
Soda, caustic		
Flake, 76%, drums, c. l. works, cwt.	4.50—	
Solid, 76%, drums, c. l. works, cwt.	4.10—	
Sodium Silicate		
40°Be, 1:3, 2, turbid, drums, c. l., works, cwt.	1.45—	
52°Be, turbid, 1:2, 4, drums, c. l., works, cwt.	2.45—	
Starch		
Pearl, 140-lb. bags, cwt.		
Pearl, barrels, cwt.		
Paper (Sq.), bags, cwt.		
Powdered, barrels, cwt.		
Sulfur, crude		
Bulk, c. l. mine, long ton	26.50—	
Talc		
Domestic, bags, c. l. works, ton	33.00—	39.50
Canadian, ground, bags, c. l. works, ton	20.00—	35.00
Titanium Dioxide		
Pigment, calcium-rutile base, regular, bags, c. l., lb.	.09¼—	
High-tinting, drums, c. l., lb.	.09	—
Zinc Oxide Pigment, American process		
Lead-free, bags, c. l., lb.	.14½—	
Leaded, 35%, bags, c. l., lb.	.15½—	

WOOD PULP

Quotations on domestic and Canadian pulp, dollars per short air-dry ton delivered consuming mills including basic allowances, follow:

Bleached sulfite, No. 1	150.00—
Bleached sulfite, Canadian	150.00—
Unbleached sulfite	130.00—
Unbleached sulfite Canadian	130.00—
Bleached soda	145.00—
Bleached soda, Canadian	145.00—
Kraft, bleached hardwood	150.00—
Kraft, bleached	152.00—155.00
Kraft, bleached southern	155.00—
Kraft, bleached Canadian	155.00—
Kraft, unbleached southern	117.50—122.50
Kraft, unbleached, Far West	125.00—
Kraft, unbleached Canadian eastern	130.00—
Kraft, unbleached Canadian western	120.00—125.00
Kraft, semi-bleached southern	140.00—
Sulfite screenings	72.50—
Sulfate screenings	67.50—
Groundwood, domestic	

Quotations on imported wood pulp, dollars per short air-dry ton on dock American Atlantic ports, follow:

Bleached sulfite, Swedish, freight allowed	150.00—
Bleached sulfite, Norwegian	145.00—
Bleached sulfite, Norwegian, del'd with limited freight allowance	145.00—
Bleached sulfite, Finish, freight allowed	150.00—
Unbleached sulfite, Swedish, freight allowed	130.00—
Unbleached sulfite, Finnish, freight allowed	130.00—
Kraft, unbleached, Swedish, freight allowed	125.00—
Kraft, unbleached, Finnish, freight allowed	125.00—
Kraft, bleached, Swedish, on dock	155.00—
Kraft, bleached, Norwegian	155.00—

PAPER

Quotations are mill quotations Chicago

Boards (prices per ton, delivered in Chicago, 10 tons or more):	
Plain chip	107.50
News vat lined chip	110.00
.009 chip, rolls	100.00
Filled news	111.50
Solid news	114.50
White vat lined chip	144.50
Chip tube and can stock	112.50
Single manila lined chip	162.50
Single jute lined chip	147.50
Container, 42-lb.	
Kraft liner (per 1000 sq. ft.)	2.68
White patent coated	
.020	175.00
.018	177.50
.016	182.50

Book Paper (f.o.b. Chicago, c.l. cases per cwt):	
No. 1 enamels	19.80
No. 2 enamels	18.80
Machine-coated, 45- to 100-lb.	14.75— 18.40
60-lb. + uncoated offset, 25 × 38 (2000 lb.)	16.55
"A" grade English finish untrimmed, 25 × 38 (2000 lb.)	15.65

Rag Content Bond (white, 5000 to 10,000-lb. sub 20, ream sealed cartons):	per cwt
100% rag	63.20
75% "	48.45
50% "	36.95
25% "	31.00

Rag Content Ledger (white, 5000 to 100,000-lb., ream sealed cartons):	
100% rag	64.40
75% "	49.60
50% "	38.10
25% "	32.20

Sulfite Bond (white, 5000 to 10,000-lb. sub 20, ream sealed cartons):	
No. 1	21.85
No. 2	21.15
No. 4	19.75

Sulfite Ledger (white, 5000 to 10,000-lb., ream sealed cartons):	
No. 1	23.10
No. 2	22.35
No. 4	20.95

Newsprint (contract base price)	per ton
Rolls, standard	131.00
Rolls, spot	185.00—220.00
Sheets	Standard differentials

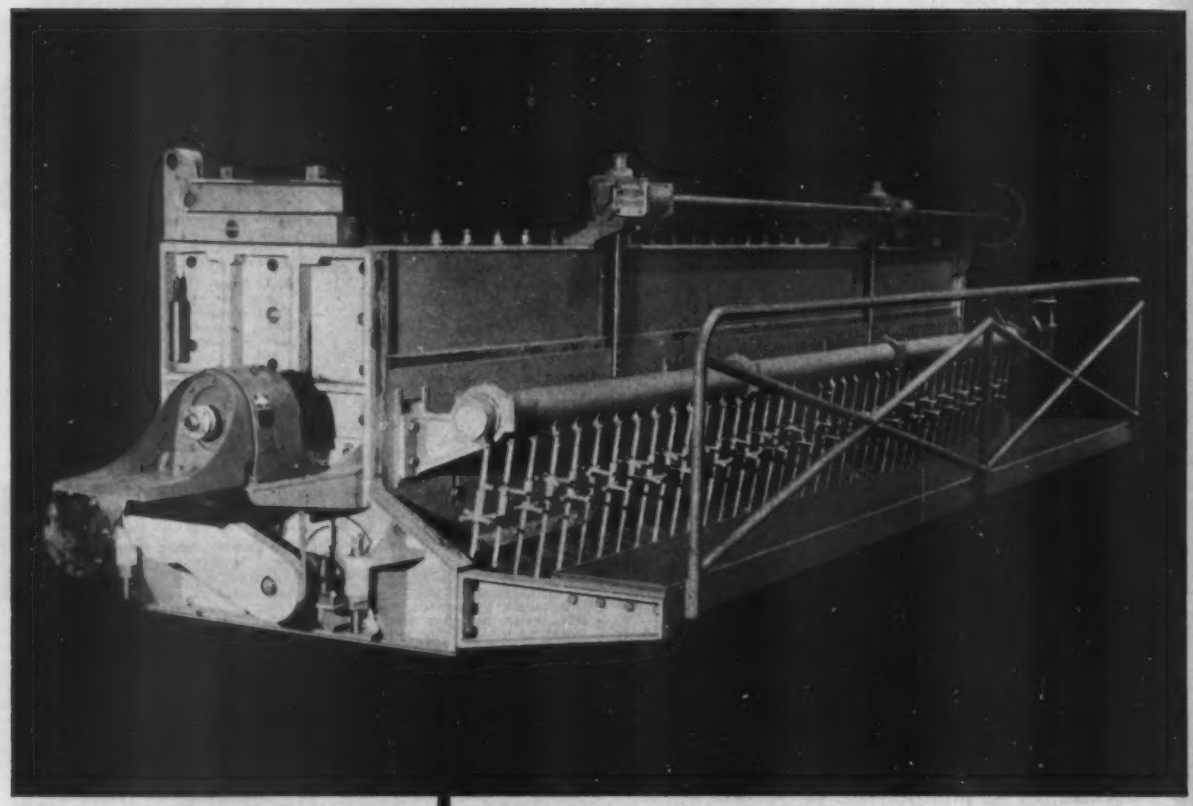
Tissues (carlots)	per ream
White No. 1	
White No. 2	
Bleached anti-tarnish	
Colored	
Anti-tarnish kraft	
Manila	
Napkins, semi-crepe (12½ lb. to M shts) per case	
Napkins, full crepe and embossed (12½ lb. to M shts) per case	
Toilet, bleached (M shts) per case	
Toilet, unbleached (M shts) per case	

Wrappings (kraft, basis 50 lb. and heavier)	per cwt
Standard wrapping	9.00
Butchers, counter rolls	10.00
Standard bagging, mill rolls	
Shipping sack, mill rolls	
Gumming, mill rolls	
Asphalting, mill rolls	
Envelope, mill rolls	

IF YOU MAKE

FOURDRINIER BOARD

THIS IS FOR YOU



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— A POTENT SAFETY TOOL

Posters should be one of the top aids in your safety program. No other safety medium can reach your entire audience—not once, but many times each day—with such low-cost safety messages. They are directed at the worker acts and worker attitudes that lead to accidents. Posters lend *timeliness, repetition and continuity* to your safety program . . . the three fundamental principles of direct selling.

The National Safety Council maintains a stock of posters that covers all industries, operations and phases of safety and health. These posters are produced in three sizes: "A" size, 8½" x 11½"; "B" size, 17x23"; and "C" size, 25x38". Their colorful illustrations and eye-catching captions make them ideal for the mass selling of safety.

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Babcock & Wilcox Co., Tubular Products Division 452
Barco Manufacturing Co. 518
Barrell Co., Wm. L. 492
Bauer Bros. Co., The 450
Beloit Iron Works 481-482
Black-Clawson Company, The 491
Bowsher Co., The N. P.
Burtonite Company, The

Cameron Machine Co. 517
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Chicago Bridge & Iron Company 448
Classified Advertising 545
Clinton Corn Processing Co.
Cooper Alloy Corporation 527
Corn Products Refining Co.
Crane Packing Company 505
Crawford Fitting Company
Curtiss-Wright Corporation 468

Darling & Company 3rd Cover
Draper Brothers Company 496

Eastwood-Nealley Corporation 537
Egan & Company, Frank W. 530
Electric Eye Equipment Company 528
English China Clays Sales Corp. 538

Falk Corporation, The 451
Fischer & Porter Company 464
Fisher Governor Co. 439
Fritz Publication, Inc. 534, 540, 545
Fulton Iron Works Co. 445

General Chemical Division 494
General Dyestuff Company 461
Gifford-Wood Co. 493
Gilbert & Nash Company
Goslin-Birmingham Mfg. Co. 513
Grace & Co., W. R.
Graton & Knight Company 541

Hanchett Manufacturing Co. 515
Hercules Powder Company
Hubinger Company, The
Hudson-Sharp Machine Company 453
Humphrey Elevator Company 533
Huyck & Sons, F. C.

Improved Machinery, Inc. 460
Ingersoll-Rand

Jackson & Church Company
Jenssen Company Inc., G. D. 545
Johnson Corporation, The 4th Cover
Josam Manufacturing Company 524

Kalamazoo Tank & Silo Co. 545
Kelco Company 514
Koppers Company, Inc.

Ladish Co. 467
Langston Co., Samuel M. 529
Layne & Bowler, Inc. 2nd Cover
Lindsay Wire Weaving Co., The
Link-Belt Company 463
Lockport Felt Company
Lodding Engineering Corp. 539

Magnuson Products Corp. 519
Master Builders Co., The 524
Mead Pulp Sales, Inc. 440
Midvale-Heppenstall Co., The
Minerals & Chemicals Corp. of America 469
Morden Machines Company
Morey Paper Mill Supply Co. 459
Morningstar, Nicol, Inc.
Murray Mfg. Co., D. J.

Nash Engineering Co., The 509
National Aluminate Corp. 1st Cover
National Aniline Division
National Safety Council 549
Naylor Pipe Company 516
Nichols Engr. & Research Corp. 454
Northern Engineering Works
Northwest Engineering Company
Norton Company

Paper and Pulp Mill Catalogue 534
Paper Industry, The 540, 545
Parsons & Whittemore/Lyddon Organization, The 444
Penick & Ford Ltd., Inc. 532
Photovolt Corporation 538
Powell Valves 442
Preload Company, Inc., The 506
Prior Chemical Corporation 538
Pusey & Jones Corp., The 501

Raymond Service, Inc., Chas. P. 545
Read Standard Corporation
Red-Ray Mfg. Co., Inc.
Roots-Connersville Blower Division 512
Ross Engineering Corp., J. O. 520
Ross Midwest Fulton Corp.
Ross Paper Machinery Company 544

St. Regis Paper Co. 446-447
Scapa Dryers, Inc. 459
Semet-Solvay Petrochemical Division 449
Shuler & Benninghofen 536
Signode Steel Strapping Company
Smidth & Co. F. L.
Stadler, Hurter & Company 538
Staley Mfg. Co., A. E. 523
Standard Oil Co. (Indiana) 510
Stein, Hall & Company
Stickle Steam Specialties Co. 525
Sutherland Refiner Corp.
Swenson Evaporator Company

Taylor-Wharton Co. 466
Testing Machines, Inc.
Texas Gulf Sulphur Co. 546

United States Movidyn Corp.

Valley Iron Works Company 548
Vapo Systems Co., Inc. 544

W-K-M Manufacturing Co., Inc. 502
Westinghouse Electric Corporation 455-458
Weverhaeuser Timber Co.
Whiting Corporation
Williams-Gray Company 538
Wisconsin Wire Works 545

Yarnall-Waring Company 465
Youngstown Welding & Engineering Company, The

Professional & Business Service Section
Sirrine Company, J. E. 544

PAPER INDUSTRY

Whither?

. . . in production, processes, new products, markets

Waterproof paper for termite control

Waterproof paper used as a vapor barrier soil cover in crawl spaces was found to create unfavorable soil conditions for termite life by waterlogging the soil underneath the paper to a point where all termite activity ceased. Experiments further showed that termites did not eat through the paper. It is suggested that waterproof paper also be used under concrete slabs in home construction.

How much water to grow a cord of pine pulpwood?

Nature uses 2000 tons of water to grow a ton of wood, according to the calculations of Robert Zahner of the Crossett Co. These calculations are based on the utilization by the forest, under Crossett conditions, of 30 inches of rainfall during a normal growing season.

Paper forms for concrete slabs

Another case (the first of such cases was described in the July, 1956, issue) where concrete slabs were poured in paper forms is reported from Los Angeles, where the second floor of a warehouse was built from waffle-like slabs cast in paper forms with egg-crate inserts. The paper forms used were made by Container Corp. of America.

Guar gum in plentiful supply

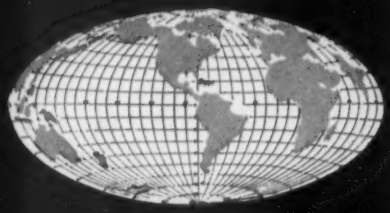
The inadvertent omission of the word "locust", defining the European bean crop, on the "Whither" page of the July issue has resulted in considerable misunderstanding. The implication made was that, in view of the locust bean crop failure in Europe, many users of locust bean gum were switching to the guar bean. This, at that time, resulted in a momentary tightness of supply, especially following the embargo on export of the seed from India. However, since then conditions have normalized, and guar gum is now abundantly available with the completion of the 1956 seed harvest.

Research in sulfite liquor disposal

Research is now underway at Appleton to find a method of reducing the oxygen demand of sulfite liquor through a minimum-investment biological process. The problem involves finding an organism or organisms that will rapidly dispose of the more easily fermentable wood sugars under a wide range of conditions. Ideally, such an organism would combine the high sugar fermenting efficiency of the yeast organism with the adaptability to changes of temperature, concentration and oxygen supply of the sewage treatment organism.

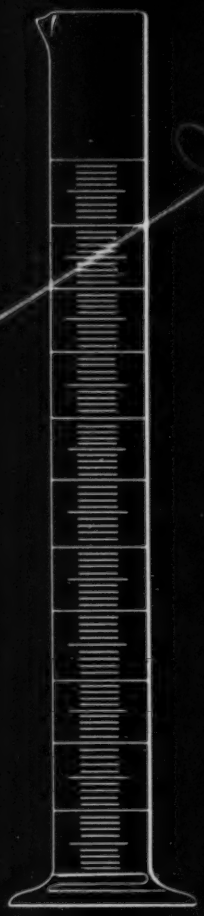
Increased whiteness of Calcofluor dye treated paper

Paper treated with Calcofluor dye has an intense whiteness and brightness. The explanation given for this phenomenon is that the invisible ultra violet light is changed by Calcofluor to visible blue light. This has the effect of balancing out the colors that are reflected to the eye and restoring whiteness by adding the blue that was previously absorbed. In addition there is the extra brilliant effect due to the reflection of more light resulting from the change of invisible to visible light.



HERE IS THE WORLD'S SMALLEST

SAVE



You'll find this miniature saveall at work in DARLING'S testing laboratory. Small as it is, it duplicates actual saveall conditions. Flocculating efficiency and clarity of effluent can be determined for a wide range of conditions . . . comparing results obtained with different glue solutions in combination with various white waters.

This device is one of many testing tools which DARLING uses in improving its product and its service.

The best place to test DARLING GLUES, of course, is in *your* saveall because—

In the great majority of cases, one of DARLING'S specifically-formulated GLUES will reduce costs while maintaining or improving recovery efficiency.

We'd like to work with you in making just such a test in your mill. The entire cost is on us. You've nothing to lose . . . plenty to gain. You can make arrangements through your DARLING SALES REPRESENTATIVE. Or write or call us collect.

DARLING'S improved BONE GLUE

DARLING & COMPANY
GLUE DIVISION
4201 South Ashland Avenue • Chicago, Illinois

SPEEDS . . . High or Low?

No problem here. The simple, packless design of Johnson Joints maintains full operating efficiency over a broad range. Many installations are serving around the clock, and around the calendar, on paper machines designed for 2500 feet per minute.

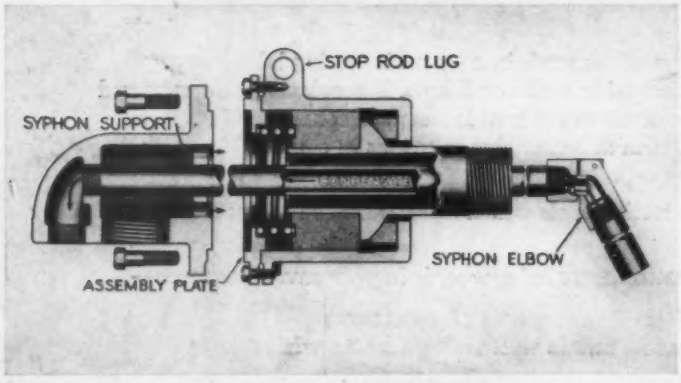
PRESSURES . . . High or Low?

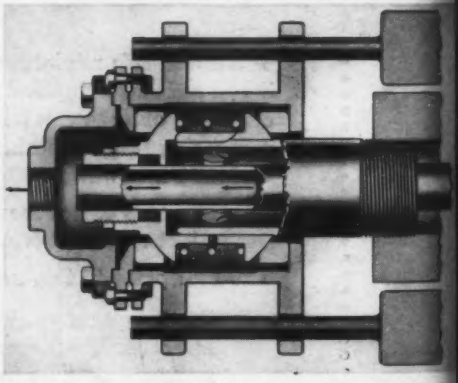
Standard units handle pressures up to 150 lbs.; heavy duty units available for pressures beyond that. Joints adjust automatically for varying pressures, and never need lubrication.

makes no difference to

JOHNSON *Rotary Pressure* JOINTS

CONDENSATE PIPE . . . Stationary or Rotating?





Type SDP Johnson Joint — completely self-supporting. Syphon elbow at right permits use of straight pipe instead of awkard curved syphon pipe; it is hinged to pass right through joint, seats of its own weight when in position. Special assembly plate holds internal parts of joint in position when head is removed.

Type LN Johnson Joint makes syphon pipe a part of rotating assembly, so it can rotate with dryer. Simple method of rod support carries all weight of joint body, permits rotating assembly to "float" freely inside with only the task of maintaining an effective seal.

Try Them Yourself!—We'll gladly supply a pair of Johnson Joints for 90-day trial installation right in your own mill, without cost or obligation to you, Write for details and literature.

845 WOOD ST., THREE RIVERS, MICH.

Rotary Pressure Joints • Direct Operated Solenoid Valves